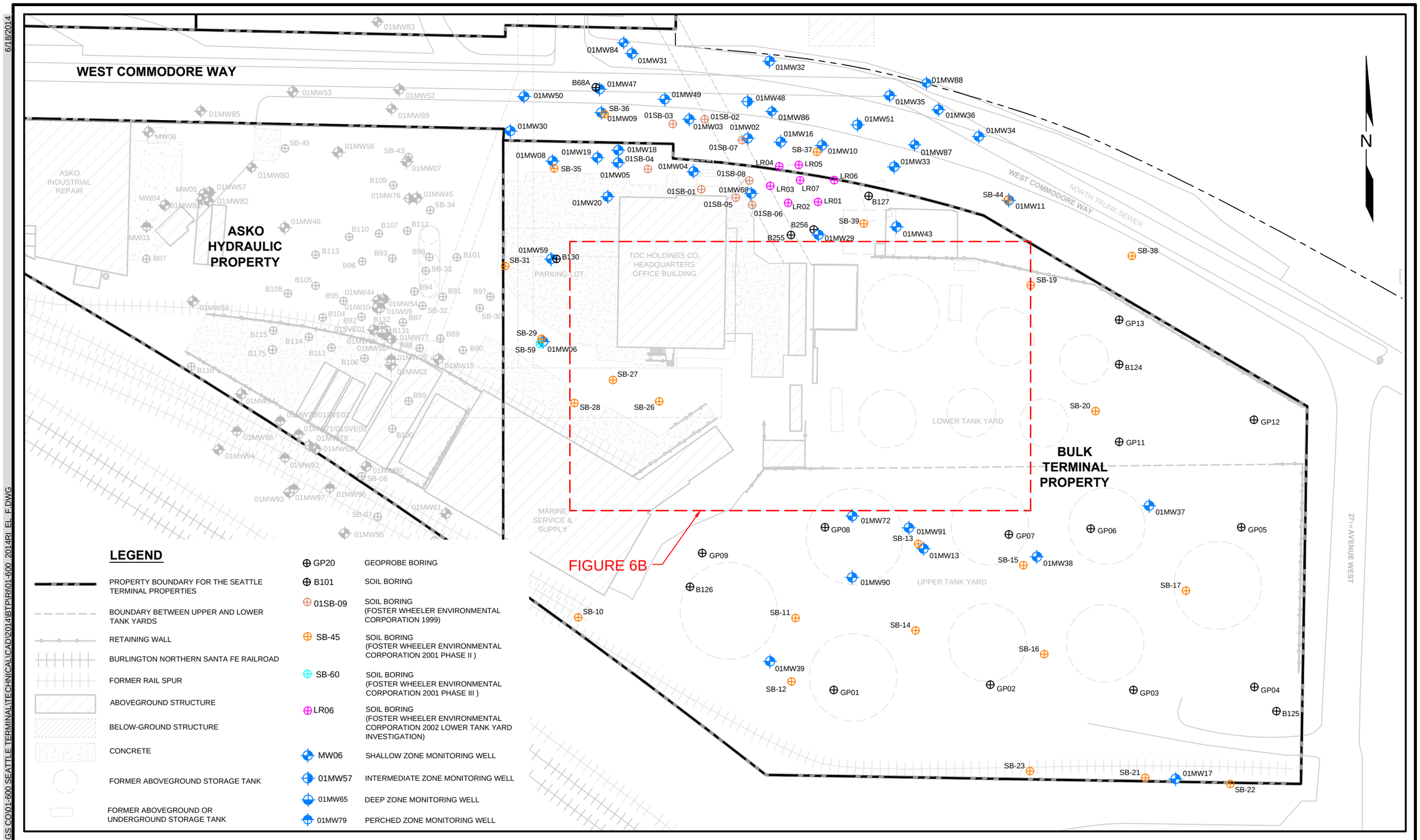
Time Oil Bulk Terminal PPA

Supplemental Upland Remedial Investigation and Feasibility Study

Appendix A
2014 RI Sample Location Figures



LEGEND

PROPERTY BOUNDARY FOR THE SEATTLE TERMINAL PROPERTIES	GP20 — GEOPROBE BORING
BOUNDARY BETWEEN UPPER AND LOWER TANK YARDS	B101 — SOIL BORING
RETAINING WALL	01SB-09 — SOIL BORING (FOSTER WHEELER ENVIRONMENTAL CORPORATION 1999)
BURLINGTON NORTHERN SANTA FE RAILROAD	SB-45 — SOIL BORING (FOSTER WHEELER ENVIRONMENTAL CORPORATION 2001 PHASE II)
FORMER RAIL SPUR	SB-60 — SOIL BORING (FOSTER WHEELER ENVIRONMENTAL CORPORATION 2001 PHASE III)
ABOVEGROUND STRUCTURE	LR06 — SOIL BORING (FOSTER WHEELER ENVIRONMENTAL CORPORATION 2002 LOWER TANK YARD INVESTIGATION)
BELOW-GROUND STRUCTURE	MW06 — SHALLOW ZONE MONITORING WELL
CONCRETE	01MW57 — INTERMEDIATE ZONE MONITORING WELL
FORMER ABOVEGROUND STORAGE TANK	01MW65 — DEEP ZONE MONITORING WELL
FORMER ABOVEGROUND OR UNDERGROUND STORAGE TANK	01MW79 — PERCHED ZONE MONITORING WELL

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DATE: 06/28/13
DRAWN BY: NAC
CHECKED BY: JAB/TSB
CAD FILE: 01-600_2014RI_EL

PROJECT NAME: TOC HOLDINGS CO. BULK TERMINAL PROPERTY
SES PROJECT NUMBER: 0440-004
STREET ADDRESS: 2737 WEST COMMODORE WAY
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 30 60 120
APPROXIMATE SCALE IN FEET

FIGURE 6A
SOIL BORING AND MONITORING WELL LOCATIONS

6/18/2014
P:\0440 TOC HOLDINGS CO\01-600 SEATTLE TERMINAL\TECHNICAL\CAD\2014\BTP\RI\01-600_2014RI_EL_F.DWG
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6/18/2014

P:\0440 TOC HOLDINGS CO\01-600 SEATTLE TERMINAL\TECHNICAL\CAD\2014\BTPAR\01-600_2014RI_EL_Z_F.DWG

TOC HOLDINGS CO.
HEADQUARTERS OFFICE BUILDING

FORMER PUMP SHED AREA

FORMER MANIFOLD PIT

FORMER PCP MIXING AST

FORMER OIL/WATER SEPARATOR

FOAMITE SHED

LOWER TANK YARD

BULK TERMINAL PROPERTY

N

01SB-09 01MW28 B254 B250 B248 B262 B257 B251 01MW24 B253 B235 B236 B238 B252 01MW42 SB-18 01MW27 B128 B216 B237 GP14 01MW69 01MW25 B224 B212 01MW67 B217 B223 B220 B214 B138 B139 B140 01MW01 01MW26 01MW23 SB-56 B211 01MW41 B218 B183 B222 B153 B210 01MW14 B154 B155 SB-24 B123 01MW12 B143 SS-03 B142 B141 SB-55 B208 B178 B182 B187 B207 B209 GP20 GP17 B215 B225 B219 B129 B157 B202 B156 B179 B181 B247 B186 01MW66 B213 B206 B158 SB-03 B122 B221 B205 B203 B204 01MW22 B146 B201 B144 SB-04 B145 B180 B185 B241 B246 SS-02 GP16 B161 01MW74 GP19 B159 B121 B160 B234 SB-54 SB-53 B245 SB-02 B149 B148 B147 B239 B242 B240 SB-05 01IW08 SB-01 01IW07 B164 B162 B243 GP10 01IW06 SS-04 01IW04 SS-01 B163 B263 01IW05 01IW03 B244 GP18 SB-52 SB-57 B150 01MW21 GP15 B184 B152 01IW02 01IW01 B151 B165 B166 01MW73 01MW75 B200 B176 B176A 01MW40 B177

LEGEND

	BOUNDARY BETWEEN UPPER AND LOWER TANK YARDS
	RETAINING WALL
	ABOVEGROUND STRUCTURE
	CONCRETE
	FORMER ABOVEGROUND STORAGE TANK
	FORMER ABOVEGROUND OR UNDERGROUND STORAGE TANK
PCP	PENTACHLOROPHENOL
AST	ABOVEGROUND STORAGE TANK

SS-01	SURFACE SAMPLE (FOSTER WHEELER ENVIRONMENTAL CORPORATION 2001 PHASE II)
01SB-09	SOIL BORING (FOSTER WHEELER ENVIRONMENTAL CORPORATION 1999)
SB-03	SOIL BORING (FOSTER WHEELER ENVIRONMENTAL CORPORATION 2001 PHASE II)
SB-57	SOIL BORING (FOSTER WHEELER ENVIRONMENTAL CORPORATION 2001 PHASE III)
MW06	SHALLOW ZONE MONITORING WELL
01MW69	ANGLED SHALLOW ZONE MONITORING WELL
01MW14	DECOMMISSIONED MONITORING WELL
GP20	GEOPROBE BORING
B101	SOIL BORING

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DATE: 06/28/13
DRAWN BY: NAC
CHECKED BY: JAB/TSB
CAD FILE: 01-600_2014RI_EL_Z

PROJECT NAME: TOC HOLDINGS CO. BULK TERMINAL PROPERTY
SES PROJECT NUMBER: 0440-004
STREET ADDRESS: 2737 WEST COMMODORE WAY
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 10 20 40
APPROXIMATE SCALE IN FEET

FIGURE 6B
SOIL BORING AND MONITORING WELL LOCATIONS - ZOOM IN

SOUNDEARTHINC.COM

5/14/2014

P:\0440 TOC HOLDINGS CO\01-600 SEATTLE TERMINALS\TECHNICAL\CAD\2013\ASKO\RI\01-600 2013RI BASE ASKO F.DWG

N

WEST WATERFRONT PROPERTY

EAST WATERFRONT PROPERTY

ASKO HYDRAULIC PROPERTY

BULK TERMINAL PROPERTY

BNSF PARCEL

WEST COMMODORE WAY

NORTH TRUNK SEWER

BNSF RAILROAD

PARKING LOT

ASKO INDUSTRIAL REPAIR

SHED

TOC HOLDINGS CO. HEADQUARTERS OFFICE BUILDING

MARINE SERVICE & SUPPLY

STEEP SLOPE

APPROXIMATE EDGE OF SLOPE

02MW14 02MW13 02MW05 GP22 02MW10 02MW08 01MW83 01MW84 01MW31 01MW32 01MW53 01MW52 B68A 01MW49 01MW50 01MW09 SB-36 01MW47 01MW48 01MW86 01MW03 01MW02 01MW16 SB-46 01MW85 MW02 SB-47 SB-48 MW06 01MW89 01MW30 SB-45 01MW56 SB-43 01MW07 01MW08 01MW19 01MW18 01MW05 SB-35 01MW04 01MW80 B109 01MW76 01MW45 01MW20 01MW68 MW05 01MW57 MW04 01MW81 01MW82 SB-34 MW01 SB-49 SB-50 01MW46 B110 B107 B112 01MW59 B130 SB-31 01MW28 MW03 B113 B96 B93 B98 B101 B07 SB-40 SB-33 01MW69 01MW27 B105 B94 B97 B128 B108 01MW58 B95 01MW44 01MW54 B91 01MW67 01IW10 01IW09 SB-32 SB-30 B104 B92 B87 01MW01 01SVE01 B132 B131 SB-29 01MW06 B115 B114 01MW65 01MW55 01MW77 B89 01MW26 B175 B111 B88 B90 B106 01MW79 01MW15 B129 B116 01MW63 SB-27 01MW66 01MW64 B99 SB-28 SB-26 01MW70/01SVE02 01MW71/01SVE03 B100 01MW98 01MW78 01MW94 01MW62 01MW92 01MW60 SB-06 01MW97 01MW96 01MW93 SB-07 01MW61 01MW95 SB-08 GP08 SB-09 B126

LEGEND

- PROPERTY BOUNDARY FOR THE SEATTLE TERMINAL PROPERTIES
- RETAINING WALL
- BNSF RAILROAD
- FORMER RAIL SPUR
- ABOVEGROUND STRUCTURE
- CONCRETE
- FORMER ABOVEGROUND STORAGE TANK
- FORMER UNDERGROUND STORAGE TANK
- BNSF — BURLINGTON NORTHERN SANTA FE RAILWAY COMPANY
- SB-45 — SOIL BORING (FOSTER WHEELER ENVIRONMENTAL CORPORATION 2001 PHASE II)
- SB-50 — SOIL BORING (FOSTER WHEELER ENVIRONMENTAL CORPORATION 2002)
- MW06 — SHALLOW ZONE MONITORING WELL
- 01MW57 — INTERMEDIATE ZONE MONITORING WELL
- 01MW65 — DEEP ZONE MONITORING WELL
- 01MW79 — PERCHED WATER MONITORING WELL
- 01MW69 — ANGLED MONITORING WELL
- B101 — SOIL BORING
- CROSS SECTION LOCATION

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DATE: 05/14/14
DRAWN BY: NAC/BLR
CHECKED BY: PJK/TSB
CAD FILE: 01-600_2013RI_BASE_ASKO

PROJECT NAME: TOC HOLDINGS CO, ASKO HYDRAULIC PROPERTY
PROJECT NUMBER: 0440-004
STREET ADDRESS: 2805 WEST COMMODORE WAY
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 25 50 100
APPROXIMATE SCALE IN FEET

FIGURE 5
EXPLORATION LOCATION PLAN

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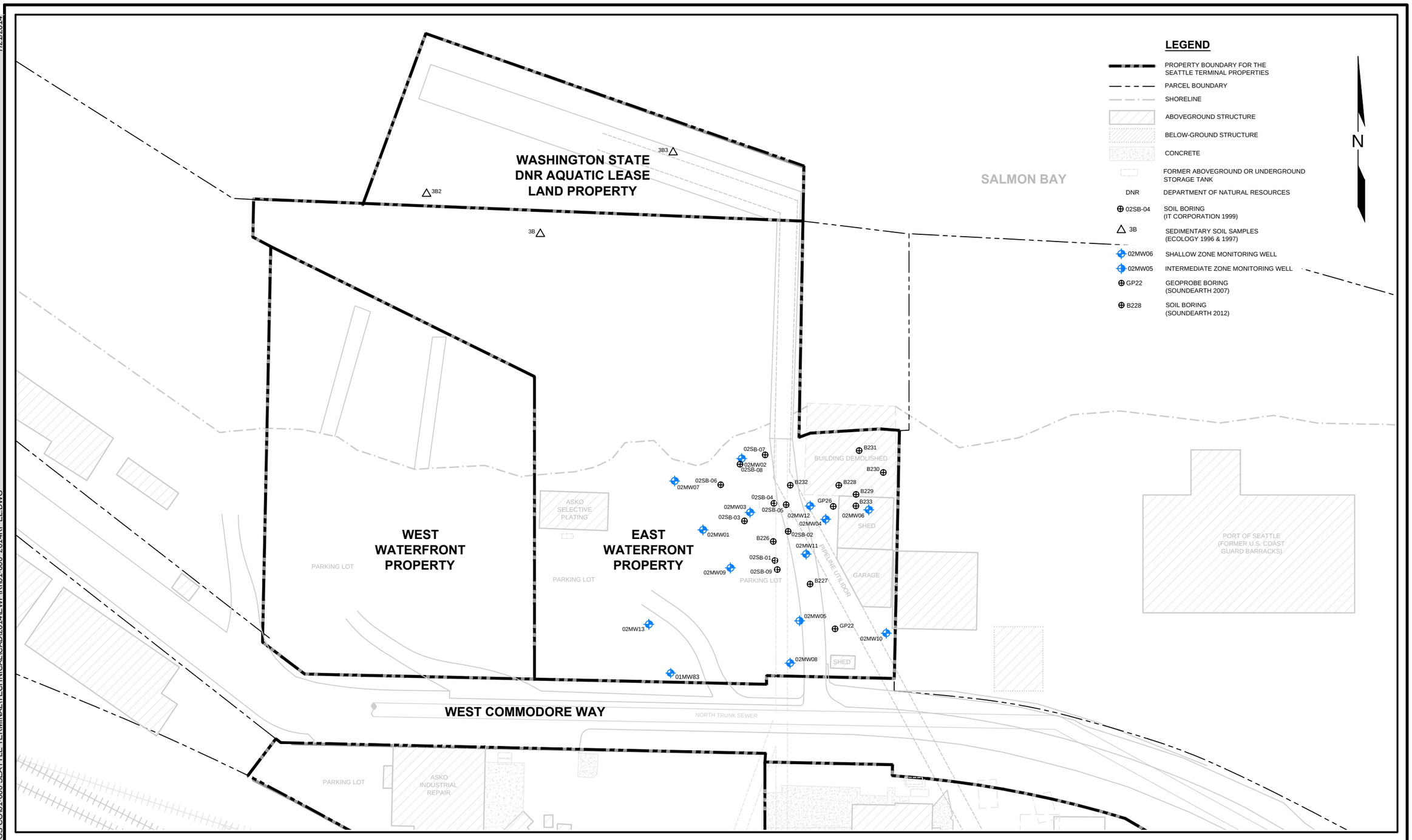
7/21/2014

P:\0440 TOC HOLDINGS CO\01-600 SEATTLE TERMINAL\TECHNICAL\CAD\2014\EWPR\R\01-600_2014RI_EL.DWG



LEGEND

- PROPERTY BOUNDARY FOR THE SEATTLE TERMINAL PROPERTIES
- PARCEL BOUNDARY
- SHORELINE
- ABOVEGROUND STRUCTURE
- BELOW-GROUND STRUCTURE
- CONCRETE
- FORMER ABOVEGROUND OR UNDERGROUND STORAGE TANK
- DNR — DEPARTMENT OF NATURAL RESOURCES
- 02SB-04 — SOIL BORING (IT CORPORATION 1999)
- 3B — SEDIMENTARY SOIL SAMPLES (ECOLOGY 1996 & 1997)
- 02MW06 — SHALLOW ZONE MONITORING WELL
- 02MW05 — INTERMEDIATE ZONE MONITORING WELL
- GP22 — GEOPROBE BORING (SOUNDEARTH 2007)
- B228 — SOIL BORING (SOUNDEARTH 2012)

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DATE: 11/19/12
DRAWN BY: NAC
CHECKED BY: PJK/TSB
CAD FILE: 01-600_2014RI_EL

PROJECT NAME: EAST WATERFRONT PROPERTY
SES PROJECT NUMBER: 0440-004
STREET ADDRESS: 2750 WEST COMMODORE WAY
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 40 80 160
APPROXIMATE SCALE IN FEET

FIGURE 7
SOIL BORING AND MONITORING WELL LOCATIONS

SOUNDEARTHINC.COM

10/24/2016

LEGEND

PROPERTY BOUNDARY FOR THE SEATTLE TERMINAL PROPERTIES

2012 EXCAVATION ELEVATION:

GREATER THAN 45 FEET

GREATER THAN OR EQUAL TO 44 FEET

GREATER THAN OR EQUAL TO 42 FEET

GREATER THAN OR EQUAL TO 41 FEET

GREATER THAN OR EQUAL TO 39 FEET

GREATER THAN OR EQUAL TO 37 FEET

GREATER THAN OR EQUAL TO 32 FEET

2011 HOT SPOT EXCAVATION AREA

DISSOLVED-PHASE PCP TREATMENT AREA AND POINT OF COMPLIANCE BOUNDARY

B101 SOIL BORING

GP17 GEOPROBE BORING

P7-EX01-SSW01 2011 HOT SPOT EXCAVATION SAMPLE POINT

PEC-SS-02 CONFIRMATION SAMPLE LOCATION (FOSTER WHEELER 2002)

SS-01 SURFACE SAMPLE LOCATION (FOSTER WHEELER 2001)

SB-01 SOIL BORING (FOSTER WHEELER 2001)

2014 SOIL BORING

CONCENTRATIONS OF PCP IN SOIL:

BELOW MTCA METHOD B CLEANUP LEVEL (2.5 mg/kg)

mg/kg MILLIGRAMS PER KILOGRAM

MTCA WASHINGTON STATE MODEL TOXICS CONTROL ACT

NAVD88 NORTH AMERICAN VERTICAL DATUM 1988

PCP PENTACHLOROPHENOL

DETECTED, BUT BELOW TREATMENT STANDARDS FOR HAZARDOUS WASTES (7.4 mg/kg) AND LESS THAN 10 TIMES THE UNIVERSAL TREATMENT STANDARD

ELEVATION IN FEET ABOVE MEAN SEA LEVEL (NAVD88)

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DATE: 10/21/16
DRAWN BY: NAC
CHECKED BY: TSB
CAD FILE: 01-600_2016_TECHMEMO

PROJECT NAME: BULK TERMINAL PROPERTY
PROJECT NUMBER: 0440-004
STREET ADDRESS: 2737 WEST COMMODORE WAY
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 10 20 40
APPROXIMATE SCALE IN FEET

FIGURE 3

SITE PLAN WITH SOIL SAMPLE LOCATIONS FOR 2011/2012 EXCAVATIONS AND 2014 SUBSURFACE INVESTIGATION FOR PCP

P:\0440 TOC HOLDINGS CO\01-600 SEATTLE TERMINAL\TECHNICAL\CAD\2016\TECHMEMO\01-600_2016_FIG3.DWG

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7/28/2015

P:\0440 TOC HOLDINGS CO\01-600 SEATTLE TERMINAL\TECHNICAL\CAD\2015\BTP\SI\01-600_BTP_2015SI_FIG2.DWG

WEST COMMODORE WAY

ASKO HYDRAULIC PROPERTY

TOC HOLDINGS CO HEADQUARTERS OFFICE BUILDING

PARKING LOT

MARINE SERVICE & SUPPLY

BULK TERMINAL PROPERTY

LOWER TANK YARD

UPPER TANK YARD

NORTH TRUNK SEWER

27TH AVENUE WEST

N

LEGEND

- PROPERTY BOUNDARY FOR THE SEATTLE TERMINAL PROPERTIES
- BOUNDARY BETWEEN UPPER AND LOWER TANK YARDS
- RETAINING WALL
- BURLINGTON NORTHERN SANTA FE RAILROAD
- FORMER RAIL SPUR
- ABOVEGROUND STRUCTURE
- BELOW-GROUND STRUCTURE
- CONCRETE
- FORMER ABOVEGROUND STORAGE TANK
- FORMER ABOVEGROUND OR UNDERGROUND STORAGE TANK

- SB-22 — SOIL BORING
- B362 — NEW SOIL BORING
- 01MW99 — NEW SHALLOW ZONE MONITORING WELL
- 01MW39 — SHALLOW ZONE MONITORING WELL
- 01MW57 — INTERMEDIATE ZONE MONITORING WELL
- 01MW65 — DEEP ZONE MONITORING WELL
- 01MW79 — PERCHED ZONE MONITORING WELL
- 01MW14 — DECOMMISSIONED MONITORING WELL

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DATE: 4/14/15
DRAWN BY: NAC/JQC
CHECKED BY: JAB/TSB
CAD FILE: 01-600_BTP_2015SI_FIG2

PROJECT NAME: TOC HOLDINGS CO. BULK TERMINAL PROPERTY
PROJECT NUMBER: 0440-004
STREET ADDRESS: 2737 WEST COMMODORE WAY
CITY, STATE: SEATTLE, WASHINGTON

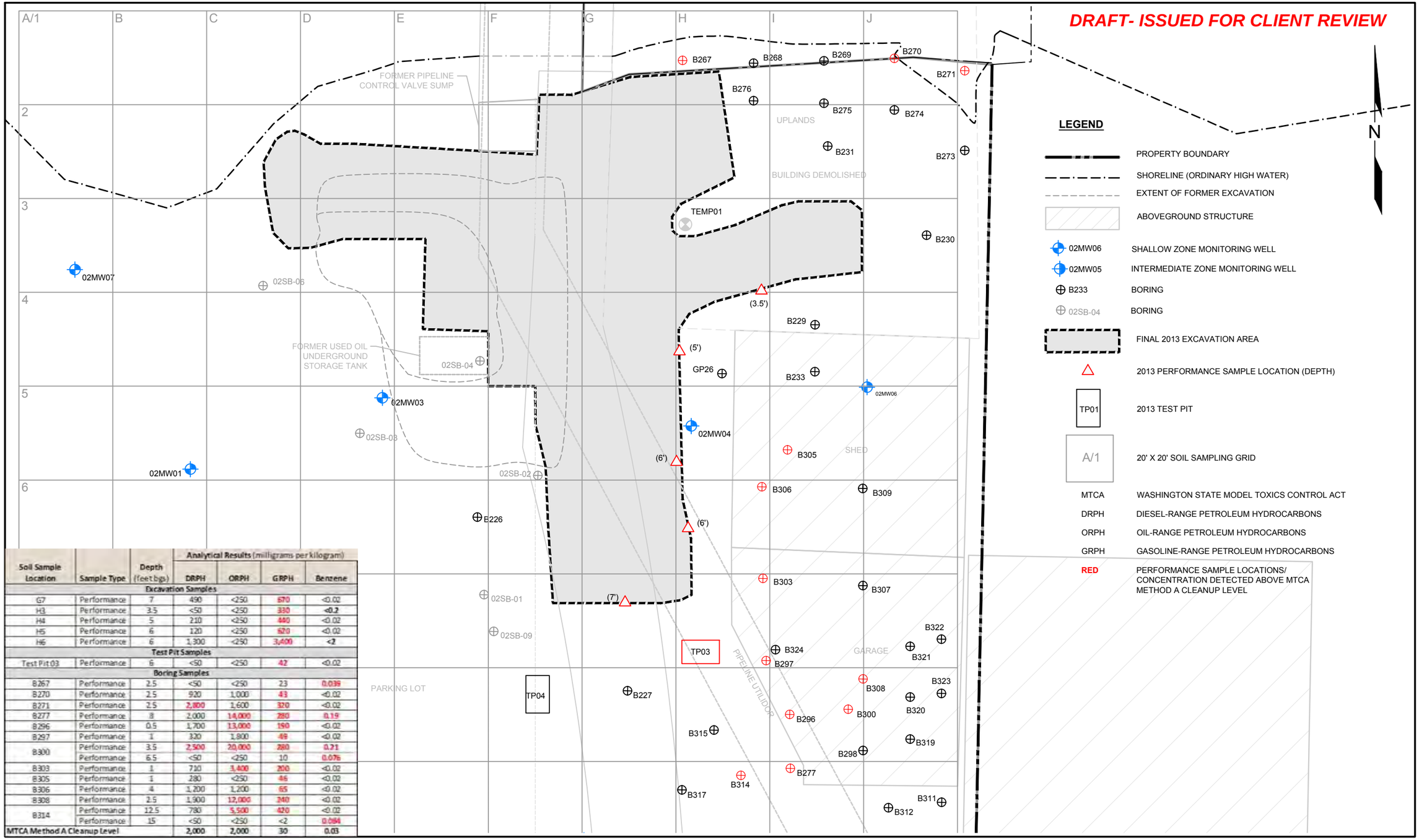
REGION:

0 30 60 120
APPROXIMATE SCALE IN FEET

FIGURE 2
EXPLORATION LOCATION PLAN

SOUNDEARTHINC.COM

DRAFT- ISSUED FOR CLIENT REVIEW



LEGEND

- PROPERTY BOUNDARY
- SHORELINE (ORDINARY HIGH WATER)
- EXTENT OF FORMER EXCAVATION
- ABOVEGROUND STRUCTURE
- 02MW06 — SHALLOW ZONE MONITORING WELL
- 02MW05 — INTERMEDIATE ZONE MONITORING WELL
- B233 — BORING
- 02SB-04 — BORING
- FINAL 2013 EXCAVATION AREA
- 2013 PERFORMANCE SAMPLE LOCATION (DEPTH)
- TP01 — 2013 TEST PIT
- A/1 — 20' X 20' SOIL SAMPLING GRID
- MTCA — WASHINGTON STATE MODEL TOXICS CONTROL ACT
- DRPH — DIESEL-RANGE PETROLEUM HYDROCARBONS
- ORPH — OIL-RANGE PETROLEUM HYDROCARBONS
- GRPH — GASOLINE-RANGE PETROLEUM HYDROCARBONS
- **RED** — PERFORMANCE SAMPLE LOCATIONS/ CONCENTRATION DETECTED ABOVE MTCA METHOD A CLEANUP LEVEL

N

Soil Sample Location	Sample Type	Depth (feet bgs)	Analytical Results (milligrams per kilogram) DRPH	ORPH	GRPH	Benzene
Excavation Samples						
G7	Performance	7	490	<250	670	<0.02
H3	Performance	3.5	<50	<250	330	**<0.2**
H4	Performance	5	210	<250	440	<0.02
H5	Performance	6	120	<250	620	<0.02
H6	Performance	6	1,300	<250	3,400	**<2**
Test Pit Samples						
Test Pit 03	Performance	6	<50	<250	42	<0.02
Boring Samples						
B267	Performance	2.5	<50	<250	23	0.039
B270	Performance	2.5	920	1,000	43	<0.02
B271	Performance	2.5	2,800	1,600	320	<0.02
B277	Performance	8	2,000	14,000	280	0.19
B296	Performance	0.5	1,700	13,000	190	<0.02
B297	Performance	1	320	1,900	49	<0.02
B300	Performance	3.5	2,500	20,000	280	0.21
	Performance	6.5	<50	<250	10	0.076
B303	Performance	1	710	3,400	200	<0.02
B305	Performance	1	280	<250	46	<0.02
B306	Performance	4	1,200	1,200	65	<0.02
B308	Performance	2.5	1,900	12,000	240	<0.02
B314	Performance	12.5	780	5,500	420	<0.02
	Performance	15	<50	<250	<2	0.064
MTCA Method A Cleanup Level			2,000	2,000	30	0.03

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DATE: 02/18/15
DRAWN BY: NAC/JQC
CHECKED BY: PJK/TSB
CAD FILE: 01-600_2014IA_RPC

PROJECT NAME: EAST WATERFRONT PROPERTY
PROJECT NUMBER: 0440-004
STREET ADDRESS: 2750 WEST COMMODORE WAY
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 10 20 40
APPROXIMATE SCALE IN FEET

FIGURE 8
EXCAVATION AND BORING SAMPLE LOCATIONS WITH RESIDUAL PETROLEUM CONTAMINATION

2/20/2015
P:\0440 TOC HOLDINGS CO\01-600 SEATTLE TERMINAL\TECHNICAL\CAD\2014\EWP\IA\01-600_2014IA_RPC.DWG
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10/28/2015

N

LEGEND

- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- SHORELINE
- ABOVEGROUND STRUCTURE
- BELOW-GROUND STRUCTURE
- 02MW16 — NEW SHALLOW ZONE MONITORING WELL
- 02MW06 — SHALLOW ZONE MONITORING WELL
- 02MW05 — INTERMEDIATE ZONE MONITORING WELL
- B233 — SOIL BORING
- UST — UNDERGROUND STORAGE TANK

WEST WATERFRONT PROPERTY

EAST WATERFRONT PROPERTY

PORT OF SEATTLE PROPERTY

ASKO SELECTIVE PLATING

WAREHOUSE BUILDING DEMOLISHED

SHED

SHED

GARAGE

PARKING LOT

PARKING LOT

PIPELINE UTILIDOR

APPROXIMATE LOCATION OF 10,000 GALLON UST

02SB-07
02MW02
02SB-08
02MW07
02SB-06
02SB-04
02MW03
02SB-03
02MW01
02SB-05
02MW12
GP26
B231
B233
02MW06
B232
B228
B229
TEMP01
TEMP02
B230
02MW04
02SB-02
B226
02MW16
B372
B356
02MW11
02SB-01
02MW09
02SB-09
B227
02MW15
B371
B355
02MW13
02MW05
GP22
02MW10
02MW08
01MW83

WEST COMMODORE WAY

SoundEarth Strategies WWW.SOUNDEARTHINC.COM	DATE: 07/27/15 DRAWN BY: NAC/JQC CHECKED BY: PJK/TSB CAD FILE: 01-600_2015_EL	PROJECT NAME: EAST WATERFRONT PROPERTY SES PROJECT NUMBER: 0440-004 STREET ADDRESS: 2750 WEST COMMODORE WAY CITY, STATE: SEATTLE, WASHINGTON	REGION:	0 20 40 80 APPROXIMATE SCALE IN FEET

FIGURE 2
EXPLORATION LOCATION PLAN

P:\0440 TOC HOLDINGS CO\01-600 SEATTLE TERMINAL\TECHNICAL\CAD\2015\EWP\SI\01-600_2015_EL.DWG

SOUNDEARTHINC.COM

Time Oil Bulk Terminal PPA

Supplemental Upland Remedial Investigation and Feasibility Study

Appendix B
Soil Boring and Monitoring Well Completion Logs

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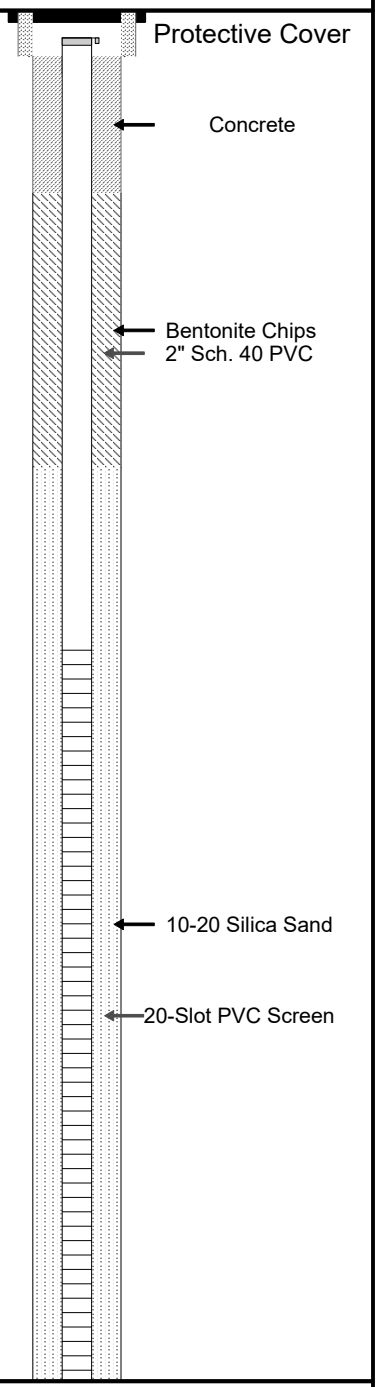
PROJECT: **Cantera- TOC**		LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **01MW101**
LOGGED BY: **K. Anderson**		COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 566**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/23/2019**	NORTHING: **245623.1098**	EASTING: **1256258.447**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **44.9**	TOC ELEVATION: **44.57**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **25**	DEPTH TO WATER (ft bgs): **10 / 17.5**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **7 - 22 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID
0	SW-SM	Moist, dark brown, well-graded **SAND** with silt and gravel (fill).			
1					
2		Moist, brown, poorly-graded, fine **SAND** with few silty pockets and angular gravel; no odor.		0.6	
3					
4					
5	SP-SM	At 5 ft., gravel content increases; soft sand with poor recovery; no odor.		0.7	No Samples Collected
6					
7					
8				0.6	
9					
10 ▼					
11	SM	Very moist, brown, poorly-graded, silty, fine **SAND**; no odor.		0.7	
12	ML	From 12-12.5 ft., compacted, gray **SILT** lens.			
13	SP-SM	Moist, brown, poorly-graded, fine **SAND** with silt; no odor.		0.6	
14					
15					



ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES: **PID= Bag Method**
Evenly decompressed recovered intervals for log and samples

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **Cantera- TOC**	LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **01MW101**
LOGGED BY: **K. Anderson**	COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 566**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/23/2019**	NORTHING: **245623.1098**	EASTING: **1256258.447**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **44.9**	TOC ELEVATION: **44.57**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **25**	DEPTH TO WATER (ft bgs): **10 / 17.5**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **7 - 22 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID	Well Construction
15	ML	From 15-15.5 ft., brown, plastic, **SILT** lens.				
15.5		Slightly moist, brown, silty **SAND**; no odor.		1		
16	SM					
16.5						
17						
17.5 ▼		Moist to wet, poorly-graded, gray-brown, fine **SAND**; no odor. Presumed shallow WBZ.		0.7		
18	SP					
18.5						10-20 Silica Sand
19						
19.5				0.6		
20		Dry, gray, stiff, sandy **SILT**.			No Samples Collected	
20.5						
21						20-Slot PVC Screen
21.5	ML			0.8		
22						
22.5						
23		At 23 ft., driller reported CDF or concrete (possible utility or utility support).				
23.5						
24	CONC.					
24.5						
25		Bottom of Boring = 25 feet; did not advance outer casing past 22 ft. due to concrete.				
25.5						

ABBREVIATIONS:
ft bgs = feet below ground surface
USCS = Unified Soil Classification System
ppm = parts per million
▼ = denotes groundwater table

NOTES: **PID= Bag Method**
Evenly decompressed recovered intervals for log and samples

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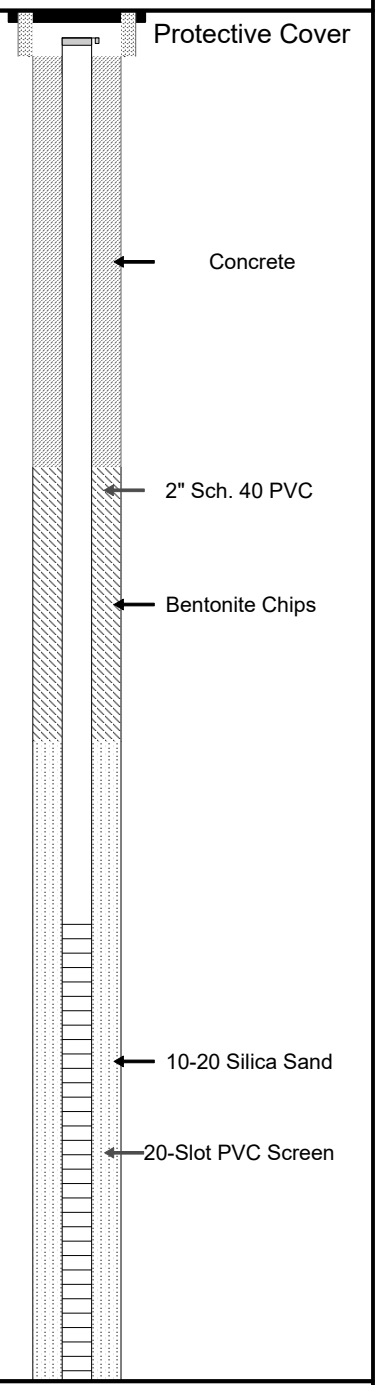
PROJECT: **Cantera- TOC**		LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **01MW102**
LOGGED BY: **K. Anderson**		COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 567**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/23/2019**	NORTHING: **245843.894**	EASTING: **1256011.563**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **21.29**	TOC ELEVATION: **20.96**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **25**	DEPTH TO WATER (ft bgs): **15**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **10 - 20 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID
0	ASPH.	**ASPHALT** ground surface.			
1	GW	Wet, brown, well-graded **GRAVEL** with sand and silt (fill).		0.9	
2	ML	Brown, sandy **SILT**.			
3		Moist to wet, brown, silty, fine **SAND**; silt lens at the bottom of sampler; no odor.		1.2	
4					
5				0.9	
6					
7	SM			0.4	No Samples Collected
8					
9				0.4	
10					
11				1.2	
12		Slightly moist, gray-brown, poorly-graded, fine **SAND** with silt; no odor.			
13	SP-SM			1.1	
14					
15 ▼					



ABBREVIATIONS:
ft bgs = feet below ground surface
USCS = Unified Soil Classification System
ppm = parts per million
▼ = denotes groundwater table

NOTES: **PID= Bag Method**
Evenly decompressed recovered intervals for log and samples

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PROJECT: **Cantera- TOC**		LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **01MW102**
LOGGED BY: **K. Anderson**		COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 567**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/23/2019**	NORTHING: **245843.894**	EASTING: **1256011.563**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **21.29**	TOC ELEVATION: **20.96**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **25**	DEPTH TO WATER (ft bgs): **15**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **10 - 20 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID	Well Construction
15		At 15 ft., becomes moist to very moist; no odor. Presumed shallow WBZ.				
15.5				1.9		
16						
16.5						
17						
17.5	SP-SM			0.9		20-Slot PVC Screen
18						
18.5						
19						
19.5				1.3	No Samples Collected	10-20 Silica Sand
20		Slightly moist, gray, stiff **SILT**.				
20.5						
21						
21.5				0.3		
22						
22.5	ML					
23						
23.5				0.4		
24						
24.5						
25						

ABBREVIATIONS:
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ppm = parts per million
USCS = Unified Soil Classification System
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NOTES: **PID= Bag Method**
Evenly decompressed recovered intervals for log and samples

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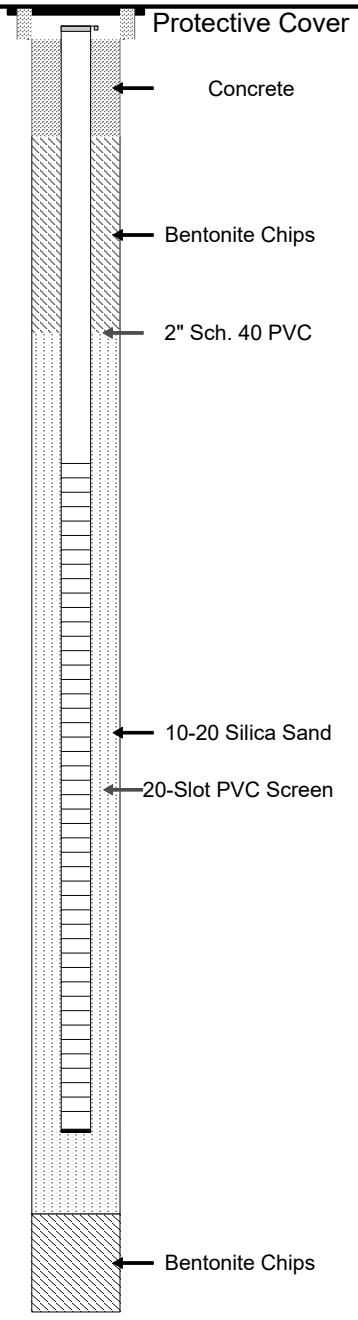
PROJECT: **Cantera- TOC**	LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **01MW103**
LOGGED BY: **K. Anderson**	COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 564**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/22/2019**	NORTHING: **245568.9101**	EASTING: **1256429.688**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**	GROUND SURFACE ELEV.: **46.48**	TOC ELEVATION: **45.79**
DRILLING METHOD: **Roto-sonic**	TOTAL DEPTH (ft bgs): **20**	DEPTH TO WATER (ft bgs): **7.5**
SAMPLING METHOD: **4" Liner Bag**	BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **7 - 17 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID
0–1	SW-SM	Dry to slightly moist, gray-brown, well-graded **SAND** with silt, gravel and geotextile membrane around 1.5 ft (structural fill); no odor.		0	
2–3	SP	Dry, red-brown, poorly-graded, fine **SAND** with trace silt.			
4		Brown, poorly-graded **SAND** with silt.		0	
5		At 5 ft., becomes moist. From 5.5-6 ft., lens with wood fragments.			
6				0	
7–8		At 7.5 ft., becomes wet; no odor. Presumed shallow WBZ.		0	
9–10	SP-SM	At 10 ft., moisture content decreases to moist.		0	
11–12				0	
13		At 13 ft., moisture content increases to wet.			
14				0	
15–16	SP	Coarse **SAND** with trace silt; no odor.		0	
17–18	ML	Slightly moist, gray, stiff, sandy **SILT**.		0	
19				0	
20		Bottom of Boring = 20 feet			

Well Construction



ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
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NOTES: **PID= Bag Method**
Evenly decompressed recovered intervals for log and samples

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PROJECT: **Cantera- TOC**		LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **01MW104 R1**
LOGGED BY: **K. Anderson**		COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **--**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/23/2019**	NORTHING: **--**	EASTING: **--**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **--**	TOC ELEVATION: **--**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **28.5**	DEPTH TO WATER (ft bgs): **10 / 19**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **--**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID	Well Construction
0	SW-SM	Gray-brown, well-graded, **SAND** with silt and gravel; no odor.				
1				0.1		
2		Moist, brown, poorly-graded, fine **SAND** with silt and gravel; no odor.				
3				0.1		
4						
5	SP-SM			0.5		
6						
7					No Samples Collected	
8				1		← Bentonite Chips
9		Moist, brown silty **SAND** with a few silt pockets; no odor.				
10 ▼	SM			0.9		
11		At 10 ft., becomes wet; no odor.				
12		At 11.5 ft, becomes slightly moist.		0.5		
13	SP-SM	Dry to slightly moist, brown, poorly-graded, fine **SAND** with silt; no odor.		0.6		
14		At 14 ft., becomes red-brown.				
15						

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:
Moved 5 ft. south to avoid potential utility.
PID= Bag Method

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PROJECT: **Cantera- TOC**		LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **01MW104 R1**
LOGGED BY: **K. Anderson**		COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **--**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/23/2019**	NORTHING: **--**	EASTING: **--**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **--**	TOC ELEVATION: **--**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **28.5**	DEPTH TO WATER (ft bgs): **10 / 19**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **--**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID	Well Construction
15	SM	Red-brown, silty **SAND**; no odor. Presumed shallow WBZ.		0.9	No Samples Collected	
16						
17				1.2		
18						
19 ▼	SP	Wet, gray-brown, poorly-graded, fine **SAND** with trace silt; no odor.		0.4		
20						
21	SM	At 21 ft., silt content increases to silty **SAND**.		0.2		← Bentonite Chips
22	ML	Dry to slightly moist, gray, firm **SILT**; no odor.				
23				0.2		
24						
25		At 24.5 ft., 6 in. of large wood fragments, possible sewer pipe lagging. Silt continues below with finer wood fragments at 26 ft.		0.3		
26						
27	SP	Wet, gray, poorly-graded, fine **SAND**; no odor.		0.1		
28	ML	Gray **SILT** with brick fragments. Abandoned boring due to possible sewer pipe construction debris.				
29		Bottom of Boring = 28.5 feet; backfilled with bentonite.				

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NOTES:
Moved 5 ft. south to avoid potential utility.
PID= Bag Method

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PROJECT: **Cantera- TOC**		LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **01MW104 R2**
LOGGED BY: **K. Anderson**		COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 568**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/24/2019**	NORTHING: **245638.7785**	EASTING: **1256184.38**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **44.63**	TOC ELEVATION: **44.12**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **40**	DEPTH TO WATER (ft bgs): **15**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **28 - 32 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID	Well Construction
0	ASPH.	**ASPHALT** ground surface.				Protective Cover
	GM	Moist, black-brown, well-graded **GRAVEL** with sand and silt.				
1		Moist, brown, very fine, silty **SAND**; no odor.		0.4		
2	SM					
3				0.3		Concrete
4		Moist, brown, poorly-graded, fine **SAND**; no odor.				
5	SP			0.7		
6		Very moist to wet, brown, poorly-graded, silty **SAND**; no odor.				
7				0.7		
8	SM					
9				0.7		
10					No Samples Collected	2" Sch. 40 PVC
11		Moist to wet, gray-brown, poorly-graded, fine **SAND** with silt; no odor.		0.4		
12						Bentonite Chips
13				0.7		
14						
15 ▼	SP-SM	At 15 ft., becomes wet. Presumed shallow WBZ.		1		
16						
17				0.8		
18						
19				1		
20						

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:
PID = Bag Method
Moved Adjacent to 01MW103
Evenly decompressed recovered intervals for log and samples

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PROJECT: **Cantera- TOC**		LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **01MW104 R2**
LOGGED BY: **K. Anderson**		COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 568**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/24/2019**	NORTHING: **245638.7785**	EASTING: **1256184.38**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **44.63**	TOC ELEVATION: **44.12**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **40**	DEPTH TO WATER (ft bgs): **15**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **28 - 32 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID	Well Construction
20	ML	Dry to slightly moist, gray, stiff **SILT**; no odor. Coarsens slightly with depth.		0.2	No Samples Collected	Bentonite Chips
23	SM	Slightly moist, very fine, silty **SAND**; no odor.		0.5		2" Sch. 40 PVC
27	ML	At 27 ft., fines to stiff **SILT**; no odor.		0.9		
29	SP-SM	Moist, poorly-graded, very fine **SAND** with silt; no odor. At 30 ft., becomes moist to wet and coarsens slightly with depth.		1		10-20 Silica Sand; 20-Slot PVC Screen
32	ML	Gray-brown, stiff **SILT**; no odor.		0.4		
35	ML			0.7		
36	ML			1.1		
37	ML			0.8		
40		Bottom of Boring = 40 feet				

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NOTES:
PID = Bag Method
Moved Adjacent to 01MW103
Evenly decompressed recovered intervals for log and samples

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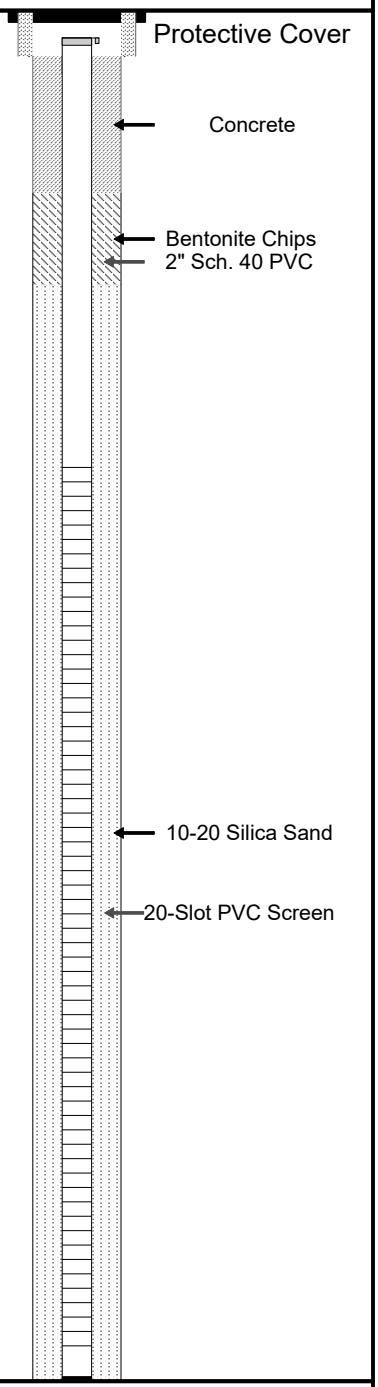
PROJECT: **Cantera- TOC**		LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **01MW105**
LOGGED BY: **K. Anderson**		COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 563**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/22/2019**	NORTHING: **245454.8225**	EASTING: **1256459.164**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **46.54**	TOC ELEVATION: **46.17**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **30**	DEPTH TO WATER (ft bgs): **10**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **5 -15 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID
0	ML	Moist, light brown, firm, sand **SILT** with orange and gray mottles; no odor.		0	No Samples Collected
4	SM	Slightly moist, gray, silty **SAND**; no odor.		0	
5	SP	Moist, gray-brown, poorly-graded, fine **SAND** with some silt; no odor.		0	
10 ▼		At 10 ft., becomes very moist to wet, and coarse; petroleum odor; no sheen; no staining. At 11 ft., odor becomes faint and disapates by 12 ft. Presumed shallow WBZ.		7.9	
12		From 12- 14 ft., possible faint sweet odor. No odor at 14 ft.		0	
14				2.9	
15					



ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
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NOTES: **PID = Bag Method**
Evenly decompressed recovered intervals for log and samples

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PROJECT: **Cantera- TOC**	LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **01MW105**
LOGGED BY: **K. Anderson**	COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 563**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/22/2019**	NORTHING: **245454.8225**	EASTING: **1256459.164**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **46.54**	TOC ELEVATION: **46.17**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **30**	DEPTH TO WATER (ft bgs): **10**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **5 -15 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID	Well Construction
15		Dry to slightly moist, gray, stiff sandy **SILT**; no odor.				
16				0		
17						
18				0		
19						
20	ML	At 20 ft., same as above; no odor.		0		
21						
22					No Samples Collected	
23						
24		At 24 ft., becomes more sandy.				
25		Very moist, silty **SAND** with few fine wood fragments; no odor. Presumed intermediate WBZ.				← Bentonite Chips
26	SM					
27		Slightly moist, stiff gray sandy **SILT**; no odor.				
28						
29	ML					
30		Bottom of Boring = 30 feet				

ABBREVIATIONS:
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NOTES: **PID = Bag Method**
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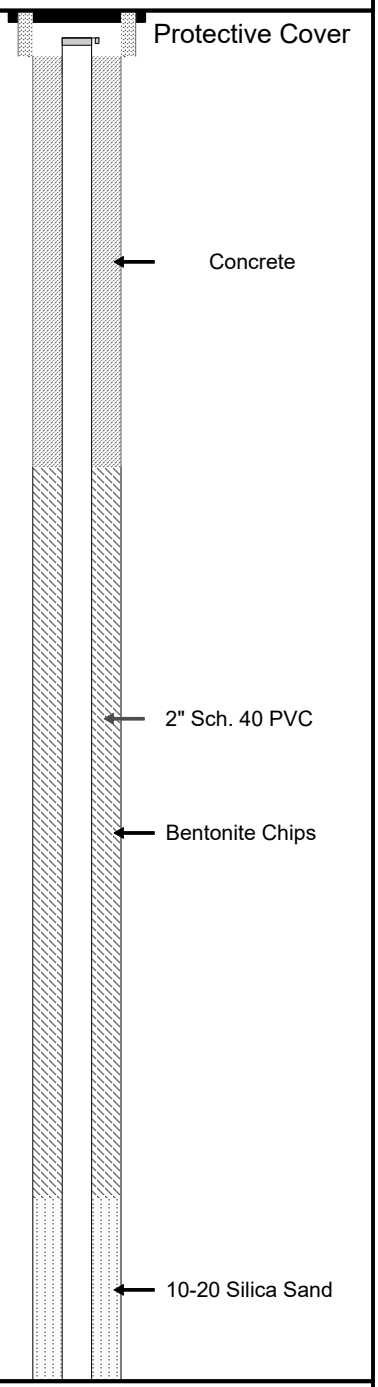
PROJECT: **Cantera- TOC**		LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **01MW106**
LOGGED BY: **K. Anderson**		COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 569**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/24/2019**	NORTHING: **245654.8008**	EASTING: **1255783.683**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **44.13**	TOC ELEVATION: **43.68**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **30**	DEPTH TO WATER (ft bgs): **21**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **15 -25 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID
0	GW	Dry to slightly moist, brown, well-graded **GRAVEL** with sand and silt.			
1				0.2	
2	SM	Brown, fine, silty **SAND** with gravel and few brick fragments; no odor.			
3				0.3	
4					
5	ML	1 ft. lens of brown, plastic **SILT**		0.1	
6	SP-SM	Moist, brown, poorly-graded, fine **SAND** with some silt; no odor,			
7				0	No Samples Collected
8					
9				0.5	
10					
11				0.2	
12					
13				0.8	
14					
15					



ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
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NOTES: **PID = Bag Method**
Evenly decompressed recovered intervals for log and samples

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PROJECT: **Cantera- TOC**	LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **01MW106**
LOGGED BY: **K. Anderson**	COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 569**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/24/2019**	NORTHING: **245654.8008**	EASTING: **1255783.683**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **44.13**	TOC ELEVATION: **43.68**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **30**	DEPTH TO WATER (ft bgs): **21**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **15 -25 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID	Well Construction
15	SP-SM	Moist, brown, poorly-graded, fine **SAND** with some silt; no odor,		1	No Samples Collected	
16		Moist, gray-brown, poorly-graded, firm **SAND** with trace to little silt; no odor.				
17				1.3		
18						
19				0.8		
20	SP					20-Slot PVC Screen
21 ▼		At 20 ft., becomes moist to wet; no odor. Presumed shallow WBZ.		0		10-20 Silica Sand
22						
23						
24		Becomes gray at the bottom of the 20-25 ft. sample.		0.1		
25	ML	Slightly moist, gray, stiff **SILT**; no odor.		0.3		
26						
27				0.5		
28						
29						
30		Bottom of Boring = 30 feet				

ABBREVIATIONS:
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ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES: **PID = Bag Method**
Evenly decompressed recovered intervals for log and samples

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PROJECT: **Cantera- TOC**		LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **01MW107**
LOGGED BY: **K. Anderson**		COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 570**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/24/2019**	NORTHING: **245653.8478**	EASTING: **1255846.677**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **44**	TOC ELEVATION: **39.69**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **30**	DEPTH TO WATER (ft bgs): **22**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **17 - 27 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID	Well Construction
0	SW-SM	Dry, brown, well-graded **SAND** with silt and gravel.		0.5	No Samples Collected	Protective Cover; Concrete
2		Slightly moist, brown, poorly-graded, fine **SAND** with silt; no odor.		1		
5				0.2		
7	SP-SM			0.3		2" Sch. 40 PVC; Bentonite Chips
8		At 8 ft., becomes moist.				
10				0.8		
11				0.9		
13	ML	Slightly moist, brown, compacted, sandy **SILT**; no odor.		0.9		
15	SP-SM	Moist, brown, poorly-graded, fine **SAND** with silt.				

ABBREVIATIONS:
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NOTES: **PID = Bag Method**
Evenly decompressed recovered intervals for log and samples

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PROJECT: **Cantera- TOC**		LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **01MW107**
LOGGED BY: **K. Anderson**		COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 570**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/24/2019**	NORTHING: **245653.8478**	EASTING: **1255846.677**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **44**	TOC ELEVATION: **39.69**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **30**	DEPTH TO WATER (ft bgs): **22**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **17 - 27 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID	Well Construction
15		At 15 ft., moisture begins increasing with depth.		0.5		
16						2" Sch. 40 PVC
17				0.7		
18	SP-SM					
19						
20				0.8		
21						10-20 Silica Sand
22 ▼		Moist to wet, gray-brown poorly graded **SAND** with trace silt; begins to coarsen slightly with depth. Presumed shallow WBZ.		0.1	No Samples Collected	20-Slot PVC Screen
23						
24	SP			0.2		
25						
26				0.5		
27		Gray, stiff, sandy **SILT**; no odor				
28	ML			1.1		
29						
30		Bottom of Boring = 30 feet				

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES: **PID = Bag Method**
Evenly decompressed recovered intervals for log and samples

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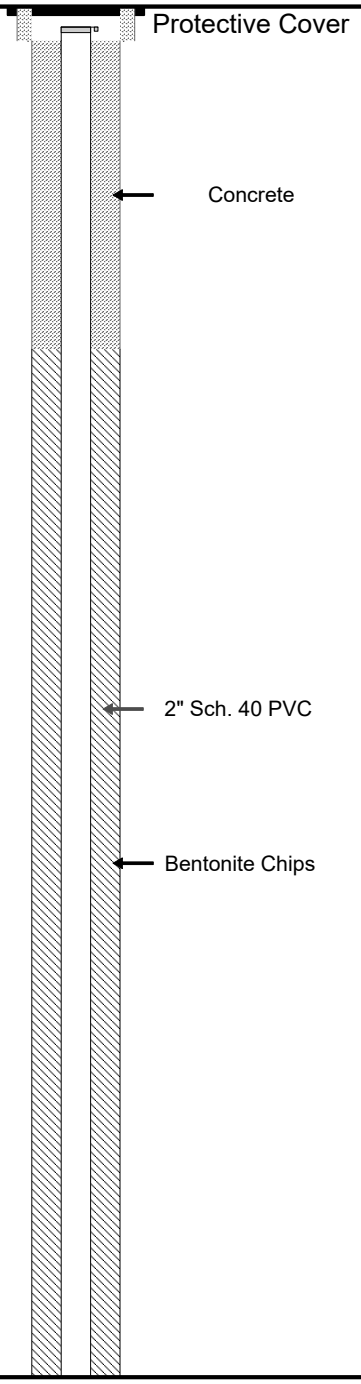
PROJECT: **Cantera- TOC**	LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **01MW108**
LOGGED BY: **K. Anderson**	COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 565**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/22/2019**	NORTHING: **245573.0267**	EASTING: **1255919.98**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **45.24**	TOC ELEVATION: **44.94**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **40**	DEPTH TO WATER (ft bgs): **8 / 20 / 31**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **30 - 35 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID
0	OL-OH	Brown **ORGANIC SOIL** with wood chips.			
1	SW-SM	Well-graded **SAND** with silt and gravel.			
2		Moist, gray-brown, poorly-graded, silty, fine **SAND**. At 4 ft., becomes brown.		0	
3	SM				
4					
5		Brown, firm, sandy **SILT**. At 5.5 ft., becomes gray.		0	
6	ML				
7				28.4	
8 ▼		Moist to wet, gray, poorly-graded **SAND** with silt; solvent-like odor.			
9	SP-SM	At 9 ft., becomes brown; no odor.		0	
10		Moist to wet, brown, silty **SAND** .			No Samples Collected
11	SM				
12				0	
13		Dry to slightly moist, sandy **SILT**; no odor.			
14	ML				
15		At 15 ft., becomes moist and soft.		0	
16		Brown, poorly-graded, fine **SAND** with silt; no odor.			
17				0	
18	SP-SM				
19					
20 ▼				0	

Well Construction



ABBREVIATIONS:
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NOTES: **PID = Bag Method**
Evenly decompressed recovered intervals for log and samples

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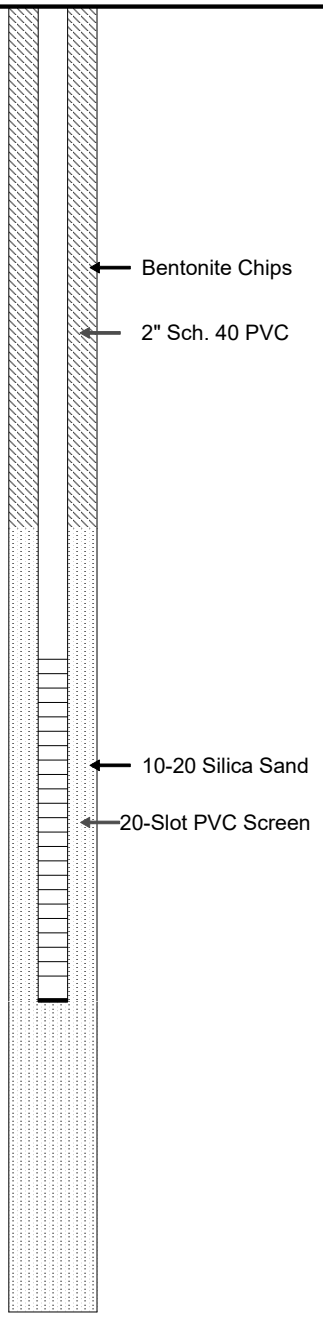
PROJECT: **Cantera- TOC**		LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **01MW108**
LOGGED BY: **K. Anderson**		COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 565**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/22/2019**	NORTHING: **245573.0267**	EASTING: **1255919.98**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **45.24**	TOC ELEVATION: **44.94**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **40**	DEPTH TO WATER (ft bgs): **8 / 20 / 31**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **30 - 35 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID
20	SP-SM	At 20 ft., becomes moist to wet; no odor. Presumed shallow WBZ.		0	No Samples Collected
23		At 23 ft., 6 in. red lens.			
24	SP	Gray, poorly-graded, medium **SAND** with trace silt; no odor.		0	
26	ML	Dry to slightly moist, gray, stiff **SILT**; no odor.		0	
30		At 30 ft., same as above.		0	
31 ▼	SM	Moist to wet, gray, silty **SAND**. Presumed intermediate WBZ.		0	
32		From 32- 32.5 ft., slightly moist, very fine silty lens followed by the same as above.			
35	ML	Dry to slightly moist, very firm **SILT**; no odor.		0	
40		Bottom of Boring = 40 feet		0	



ABBREVIATIONS:
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NOTES: **PID = Bag Method**
Evenly decompressed recovered intervals for log and samples

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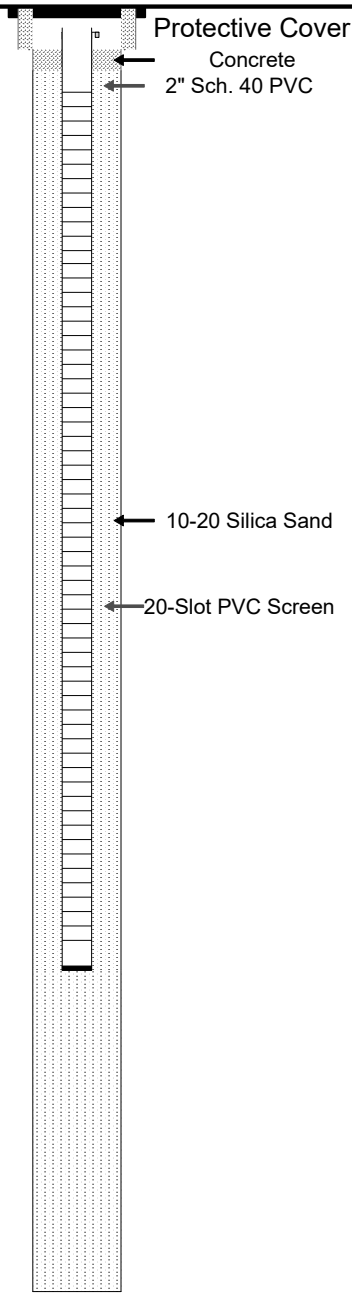
PROJECT: **Cantera- TOC**	LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **02MW17**
LOGGED BY: **K. Anderson**	COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 576**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/29/2019**	NORTHING: **245843.9578**	EASTING: **1256004.407**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **21.27**	TOC ELEVATION: **20.73**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **15**	DEPTH TO WATER (ft bgs): **3**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **1 - 11 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID
0	OL-OH	From 0-0.75 ft., moist, brown **ORGANIC SOIL**.			
1		Moist, brown, well-graded **SAND** with gravel and trace silt (excavation backfill).		0.2	
2					
3 ▼	SW	At 3 ft., soil becomes moist to wet. Presumed shallow WBZ.		0.1	
4					
5		Moist, brown, well-graded **SAND** with gravel and trace silt.		0.1	
6		Wet, gray-brown, poorly-graded, silty, fine **SAND**; no odor.			
7	SM			0.3	No Samples Collected
8					
9		Wet, gray, poorly-graded, fine **SAND** with trace silt.		0.4	
10	SP				
11		Slightly moist, stiff, gray **SILT**; no odor.		0.2	
12					
13	ML			0.2	
14					
15		Bottom of Boring = 15 feet			



ABBREVIATIONS:
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NOTES: **PID= Bag Method**
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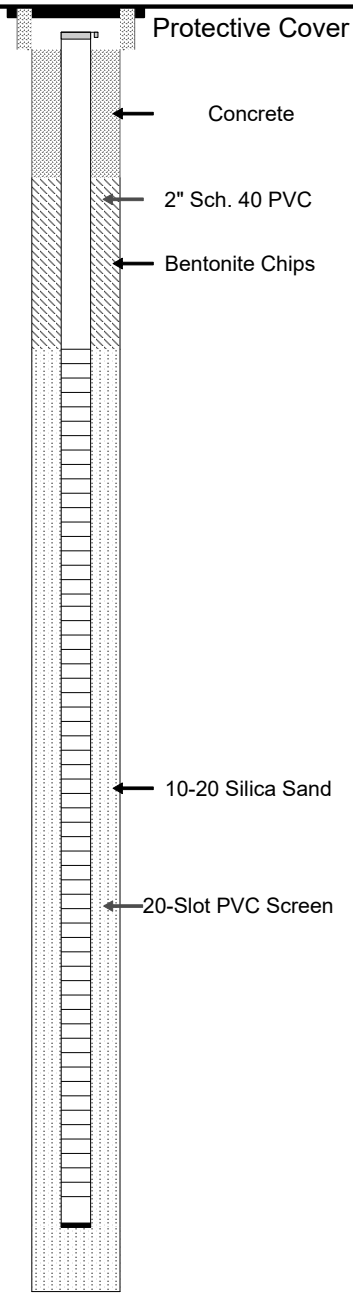
PROJECT: **Cantera- TOC**		LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **02MW18**
LOGGED BY: **K. Anderson**		COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 573**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/26/2019**	NORTHING: **245805.536**	EASTING: **1255824.049**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **24.45**	TOC ELEVATION: **23.98**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **15**	DEPTH TO WATER (ft bgs): **6**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **4 - 14 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID
0	OL-OH	From 0-0.5 ft., moist, brown **ORGANIC SILT** with gravel.			SS-02-0-0.5FT
		Moist, brown, well-graded, silty **SAND** with gravel; no odor.		1	
1					
2	SM				
3				0.7	
4					
	ML	From 4.5 - 5.5 ft., **SILT** lens.			
5		At 6 ft., becomes wet, gray, silt, fine **SAND** with no gravel; no odor. Presumed shallow WBZ.			
6 ▼				0.7	
7	SM				
8				0.6	
9		Brown, poorly-graded, fine **SAND** with silt.			
				0.8	
10	SP-SM				
11				0.4	
12	ML	From 12 - 12.5 ft., silt lens.			
		Brown, poorly-graded, fine **SAND** with silt.			
13	SP-SM			0.5	
14					
	ML	Slightly moist, stiff, gray **SILT**.			
15		Bottom of Boring = 15 feet			



ABBREVIATIONS:
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NOTES: **PID= Bag Method**
Moved 10 ft. South due to access issue and goose nest

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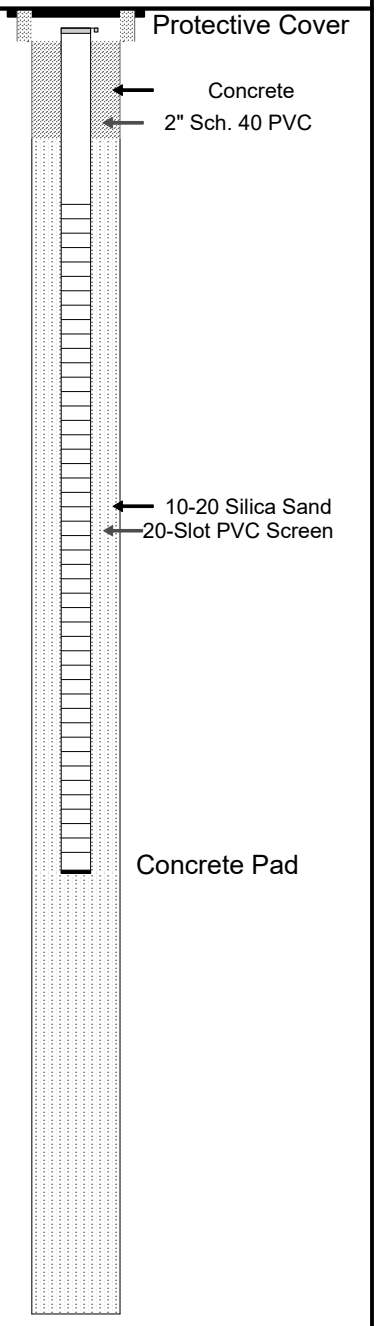
PROJECT: **Cantera- TOC**		LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **02MW19**
LOGGED BY: **K. Anderson**		COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 575**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/26/2019**	NORTHING: **245653.8478**	EASTING: **1255846.677**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **44**	TOC ELEVATION: **39.69**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **20**	DEPTH TO WATER (ft bgs): **4**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **3 - 13 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID
0	ASPH.	**ASPHALT** ground surface.			SS-03-0.25-0.7 5FT
1	SM	Moist, brown, well-graded, silty **SAND** with gravel; no odor.		0.1	
2					
3					
4 ▼		At 4 ft., becomes wet, without gravel. At 4.5 ft., uncreosoted wood fragments followed by dark brown soil then same as above by 5 ft. Presumed shallow WBZ.		0.2	
5				0.2	
6					
7	SP-SM	Wet, gray, poorly-graded, fine **SAND** with some silt and few rounded gravel; some gravel greater than 2 in. in diameter.		0.3	
8		At 8 ft., becomes brown; no odor.			
9				0.4	
10		At 10 ft., becomes very wet and loose. Driller notes possible sand heave.			
11				0.2	
12	SP	Wet, gray, poorly-graded, fine **SAND**.			
13	ML	From 13-13.5 ft., soft, plastic, sandy **SILT** lens.			
14	SP-SM	Gray, poorly-graded, fine **SAND** with silt. At 14.95 ft., silt content increases to very silty.		0.4	
15	ML	Slightly moist, gray, stiff **SILT**.		0.4	
16					
17	SP	From 17-17.5 ft., sandy lens followed by same as above.		0	
18	ML	Slightly moist, gray, stiff **SILT**.			
19					
20		Bottom of Boring = 20 feet			



ABBREVIATIONS:
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NOTES: **PID= Bag Method**
Evenly decompressed recovered intervals for log and samples

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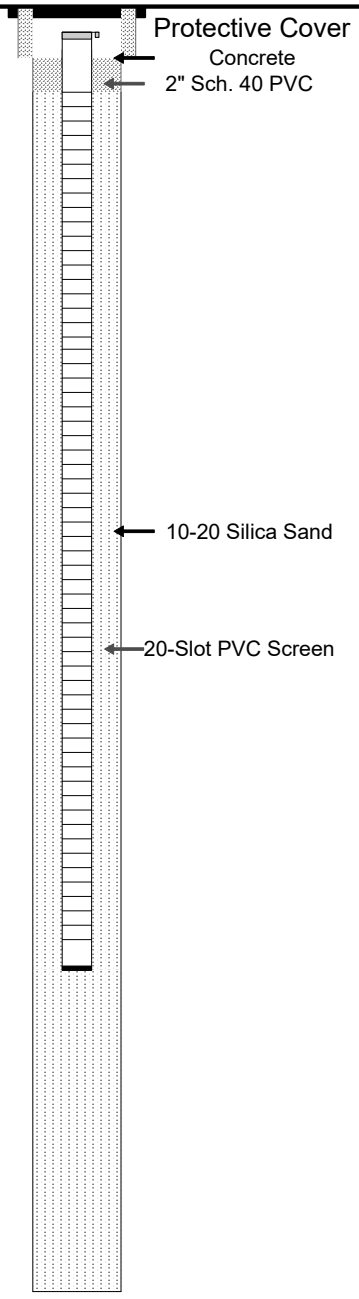
PROJECT: **Cantera- TOC**	LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **02MW20**
LOGGED BY: **K. Anderson**	COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 572**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/25/2019**	NORTHING: **245847.1109**	EASTING: **1256130.2**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**	GROUND SURFACE ELEV.: **20.56**	TOC ELEVATION: **20.07**
DRILLING METHOD: **Roto-sonic**	TOTAL DEPTH (ft bgs): **15**	DEPTH TO WATER (ft bgs): **3**
SAMPLING METHOD: **4" Liner Bag**	BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **1 - 11 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID
0	OL-OH	Moist, dark brown **ORGANIC SOIL** with well-graded sand, silt, and gravel.			
1	SM	Moist, brown, silty **SAND**; possible very faint petroleum odor with stronger odor at 2 ft. At 2.75 ft, 3 in. chunk of creosote-treated wood pile cored by sampler.		100	02MW20-1.5-2 FT
2					
3 ▼	SP-SM	Wet, gray, very fine, poorly-graded **SAND** with silt. Presumed shallow WBZ.			
	ML	Stiff gray **SILT** lens.			
4	SP-SM	Wet, gray, very fine, poorly-graded **SAND** with silt.		0	
5					
6		At 6 ft., becomes brown; no odor.		0.2	
7		At 7 ft., a large rock was cored.		0.1	
8					
9		At 8.5 ft., coarsens to medium; no odor.			
10	ML	Dry to slightly moist, stiff, gray **SILT**.		0.2	
11				0.2	
12					
13	SP-SM	**SAND** lens followed by same as above; no odor.			
14	ML				
15		Bottom of Boring = 15 feet.			



ABBREVIATIONS:
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NOTES: **Moved 5 ft. south and 15 ft. east to delineate soil contaminant and avoid shallow area on shoreline**

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PROJECT: **Cantera- TOC**		LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **02MW21**
LOGGED BY: **K. Anderson**		COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 576**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/26/2019**	NORTHING: **245843.894**	EASTING: **1256011.563**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **21.29**	TOC ELEVATION: **20.96**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **30**	DEPTH TO WATER (ft bgs): **2.5**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **18 - 28 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID	Well Construction
0	OL-OH	Moist, brown, **ORGANIC SOIL**.				Protective Cover
1		Moist,well-graded, **SAND** with gravel and trace silt.		0.2		Concrete
2						
3	SW	At 2.5 ft., becomes moist to wet. Presumed shallow WBZ.		0.1		
4						
5						
6	SM	Wet, gray, poorly-graded, silty **SAND**; no odor.		0.3		
7	ML	From 7- 7.25 ft., 3 in. **SILT** lens.		0.1	No Samples Collected	
8	SP-SM	Wet, gray, poorly-graded, fine **SAND** with silt.				2" Sch. 40 PVC
9						Bentonite Chips
10	SM	From 9.5 to 9.25 ft., soft, silty **SAND** lens followed by wet, gray, poorly-graded,, medium **SAND** with trace silt.		0		
11	ML	Slightly moist, stiff, gray **SILT**; no odor. At 12.5 ft., 1 in. sand lens.		0.1		
12						
13				0.1		
14						
15						

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NOTES: **PID= Bag Method**
Evenly decompressed recovered intervals for log and samples

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PROJECT: **Cantera- TOC**	LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **02MW21**
LOGGED BY: **K. Anderson**	COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 576**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/26/2019**	NORTHING: **245843.894**	EASTING: **1256011.563**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **21.29**	TOC ELEVATION: **20.96**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **30**	DEPTH TO WATER (ft bgs): **2.5**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **18 - 28 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID	Well Construction
15	ML	At 17.5 ft., 2 in. sandy lens then same as above.		0.2	No Samples Collected	Bentonite Chips
16						
17						2" Sch. 40 PVC
18				0.3		
19						
20	SM	At 19.5 ft., wet, gray, soft, silty **SAND**.		0.3		
21	SP	Wet, gray, poorly-graded, medium **SAND** with trace silt; no odor. Presumed intermediat WBZ.		0.1		
22						10-20 Silica Sand
23						20-Slot PVC Screen
24				0.1		
25						
26	SM	At 26 ft., moist, very fine, silty **SAND**.		0.2		
27						
28	ML	Slightly moist, sandy **SILT**		0.3		
29						
30		Bottom of Boring = 30 feet				

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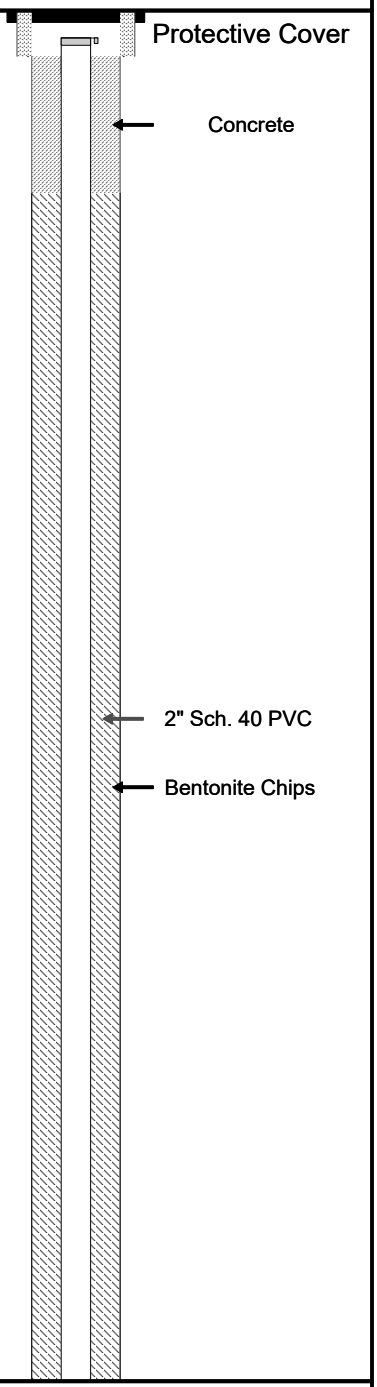
PROJECT: **Cantera- TOC**		LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **02MW22**
LOGGED BY: **K. Anderson**		COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 571**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/25/2019**	NORTHING: **245848.1533**	EASTING: **1256116.778**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**		GROUND SURFACE ELEV.: **20.25**	TOC ELEVATION: **19.48**
DRILLING METHOD: **Roto-sonic**		TOTAL DEPTH (ft bgs): **30**	DEPTH TO WATER (ft bgs): **3**
SAMPLING METHOD: **4" Liner Bag**		BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **17 - 27 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID
0	SM	Moist, black-brown, well-graded, silty **SAND** with gravel.			
1		Moist, gray, poorly-graded, fine **SAND** with silt; petroleum odor.		304	02MW22-1.5-2 FT
2					
3 ▼	SP-SM	At 3ft., becomes wet. Presumed shallow WBZ.		4.5	02MW22-3.5-4 FT
4					
5		At 5 ft., becomes brown.		0.4	
6	SP	Wet, gray, poorly-graded, fine **SAND** with trace silt.			
7					
8	ML	From 7.5 to 8 ft., stiff silt lens.		0.4	
	SP	Poorly-graded sand lens.			
9		Moist, gray, moderately stiff, sandy **SILT**.		0.6	
10					
11	ML			0.3	
12					
13		At 13 ft., becomes dry to slightly moist and stiffness increases.		0.3	
14					
15					



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NOTES: **PID= Bag Method**
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PROJECT: **Cantera- TOC**	LOCATION: **2737 W Commodore Way, Seattle, WA**	WELL ID: **02MW22**
LOGGED BY: **K. Anderson**	COORDINATE SYSTEM: **NAV83 WA State Plane N & NAV88**	ECOLOGY WELL ID: **BLR 571**
DRILLED BY: **Holocene- Zach Bailey**	DRILL DATE: **4/25/2019**	NORTHING: **245848.1533**	EASTING: **1256116.778**
DRILLING EQUIPMENT: **Roto- Sonic Limited Access Rig**	GROUND SURFACE ELEV.: **20.25**	TOC ELEVATION: **19.48**
DRILLING METHOD: **Roto-sonic**	TOTAL DEPTH (ft bgs): **30**	DEPTH TO WATER (ft bgs): **3**
SAMPLING METHOD: **4" Liner Bag**	BORING DIAMETER: **4"/6"**	SCREENED INTERVAL: **17 - 27 ft.**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	PID (ppm)	Sample ID	Well Construction
15	ML	Dry to slighly most, gray, moderately stiff **SILT**		0.4	No Samples Collected	2" Sch. 40 PVC
16						
17				0.7		
18	SP-SM	Very moist, gray, poorly-graded, fine **SAND** with silt; no odor. Presumed intermediate WBZ.				
19	SP	At 19 ft., silt content decreases to trace silt.		0.5		
20						
21				0.5		10-20 Silica Sand
22	SM	Moist, gray, firm, very fine, silty **SAND**.				20-Slot PVC Screen
23				0.3		
24	ML	At 24 ft., Fines downward to sandy **SILT**.				
25				0.5		
26						
27				0.5		
28		From 27.5 to 28 ft., sandy lens. Some thin sandy lenses above and below.				
29				0.3		
30		Bottom of Boring = 30 feet				

ABBREVIATIONS:
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NOTES: **PID= Bag Method**
Evenly decompressed recovered intervals for log and samples

Time Oil Bulk Terminal PPA

Supplemental Upland Remedial Investigation and Feasibility Study

Appendix C
2019 RI Laboratory Reports

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
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August 22, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included is the amended report from the testing of material submitted on April 26, 2019 from the Cantera-TOC, F&BI 904556 project. 1- and 2- methylnaphthalene were added to the report.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0514R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
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May 14, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on April 26, 2019 from the Cantera-TOC, F&BI 904556 project. There are 45 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
PTC0514R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on April 26, 2019 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera-TOC, F&BI 904556 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
904556 -01	02MW22-1.5-2FT
904556 -02	02MW22-3.5-4FT
904556 -03	02-MW20-1.5-2FT
904556 -04	SS-02-0-0.5FT
904556 -05	SS-03-0.25-0.75FT
904556 -06	SS-01-0-0.4FT
904556 -07	IDW-01
904556 -08	IDW02

The sample IDW-03 was prepared by compositing samples IDW-01 and IDW02.

Sample 02MW22-1.5-2FT was sent to Fremont Analytical for EPH and VPH analyses. The report is enclosed.

All quality control requirements were acceptable.

Date of Report: 05/14/19
Date Received: 04/26/19
Project: Cantera-TOC, F&BI 904556
Date Extracted: 04/29/19 and 05/07/19
Date Analyzed: 04/30/19 and 05/07/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 58-139)
02MW22-1.5-2FT 904556-01 1/10	340	111
IDW-01 904556-07	<5	80
IDW02 904556-08	<5	80
IDW-03 904556-07,08	<5	79
Method Blank 09-821 MB	<5	88
Method Blank 09-831 MB2	<5	81

Date of Report: 05/14/19
Date Received: 04/26/19
Project: Cantera-TOC, F&BI 904556
Date Extracted: 04/29/19
Date Analyzed: 04/30/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-132)
02MW22-3.5-4FT 904556-02	<0.02	<0.02	<0.02	<0.06	<5	79
02-MW20-1.5-2FT 904556-03 1/20	<0.4	1.4	1.3	1.8	440	75
Method Blank 09-821 MB	<0.02	<0.02	<0.02	<0.06	<5	114

Date of Report: 05/14/19
Date Received: 04/26/19
Project: Cantera-TOC, F&BI 904556
Date Extracted: 04/29/19 and 05/07/19
Date Analyzed: 04/29/19 and 05/07/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 56-165)
02MW22-1.5-2FT 904556-01	<50	<250	99
02MW22-3.5-4FT 904556-02	<50	<250	111
02-MW20-1.5-2FT 904556-03	1,400 x	2,000	101
IDW-01 904556-07	<50	<250	109
IDW02 904556-08	<50	<250	104
IDW-03 904556-07,08	<50	<250	107
Method Blank 09-978 MB	<50	<250	110
Method Blank 09-1053 MB	<50	<250	107

Analysis For Total Metals By EPA Method 6020B

Client ID:	SS-02-0-0.5FT	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/01/19	Lab ID:	904556-04
Date Analyzed:	05/01/19	Data File:	904556-04.140
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	29.8
Barium	68.9
Cadmium	45.7
Chromium	35.2 J
Lead	83.6
Mercury	<0.25
Selenium	<0.5
Silver	2.44

Analysis For Total Metals By EPA Method 6020B

Client ID:	SS-02-0-0.5FT	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/01/19	Lab ID:	904556-04 x10
Date Analyzed:	05/02/19	Data File:	904556-04 x10.044
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	42.5

Analysis For Total Metals By EPA Method 6020B

Client ID:	SS-03-0.25-0.75FT	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/01/19	Lab ID:	904556-05
Date Analyzed:	05/01/19	Data File:	904556-05.141
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	25.6
Barium	49.4
Cadmium	1.89
Chromium	23.9 J
Lead	102
Mercury	<0.25
Selenium	<0.5
Silver	0.141 j

Analysis For Total Metals By EPA Method 6020B

Client ID:	SS-03-0.25-0.75FT	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/01/19	Lab ID:	904556-05 x10
Date Analyzed:	05/02/19	Data File:	904556-05 x10.045
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	27.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	SS-01-0-0.4FT	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/01/19	Lab ID:	904556-06
Date Analyzed:	05/01/19	Data File:	904556-06.142
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.19
Barium	35.8
Cadmium	<0.5
Chromium	18.4 J
Lead	17.1
Mercury	<0.25
Selenium	<0.5
Silver	<0.1 j

Analysis For Total Metals By EPA Method 6020B

Client ID:	SS-01-0-0.4FT	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/01/19	Lab ID:	904556-06 x5
Date Analyzed:	05/01/19	Data File:	904556-06 x5.139
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	19.9

Analysis For Total Metals By EPA Method 6020B

Client ID:	IDW-01	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/07/19	Lab ID:	904556-07
Date Analyzed:	05/07/19	Data File:	904556-07.080
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.86
Barium	64.7
Chromium	20.6 J
Copper	15.1 J
Lead	4.21
Nickel	27.6 J
Zinc	30.6 J

Analysis For Total Metals By EPA Method 6020B

Client ID:	IDW-01	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/07/19	Lab ID:	904556-07 x5
Date Analyzed:	05/07/19	Data File:	904556-07 x5.085
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	25.2
Copper	<25
Nickel	33.7
Zinc	38.1

Analysis For Total Metals By EPA Method 6020B

Client ID:	IDW-01	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/07/19	Lab ID:	904556-07
Date Analyzed:	05/09/19	Data File:	904556-07.042
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Cadmium	<0.5
Mercury	<0.25
Silver	<0.1 j

Analysis For Total Metals By EPA Method 6020B

Client ID:	IDW-01	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/07/19	Lab ID:	904556-07
Date Analyzed:	05/09/19	Data File:	904556-07.084
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Selenium	<0.5

Analysis For Total Metals By EPA Method 6020B

Client ID:	IDW02	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/07/19	Lab ID:	904556-08
Date Analyzed:	05/07/19	Data File:	904556-08.081
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.10
Barium	78.7
Chromium	21.1 J
Copper	18.4 J
Lead	4.38
Nickel	28.4 J
Zinc	35.2 J

Analysis For Total Metals By EPA Method 6020B

Client ID:	IDW02	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/07/19	Lab ID:	904556-08 x5
Date Analyzed:	05/07/19	Data File:	904556-08 x5.086
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	26.0
Copper	<25
Nickel	36.5
Zinc	43.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	IDW02	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/07/19	Lab ID:	904556-08
Date Analyzed:	05/09/19	Data File:	904556-08.043
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Cadmium	<0.5
Mercury	<0.25
Silver	<0.1 j

Analysis For Total Metals By EPA Method 6020B

Client ID:	IDW02	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/07/19	Lab ID:	904556-08
Date Analyzed:	05/09/19	Data File:	904556-08.085
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Selenium	<0.5

Analysis For Total Metals By EPA Method 6020B

Client ID:	IDW-03	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/07/19	Lab ID:	904556-07,08
Date Analyzed:	05/07/19	Data File:	904556-07,08.082
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.00
Barium	66.6
Chromium	20.4 J
Copper	18.8 J
Lead	7.75
Nickel	27.4 J
Zinc	34.6 J

Analysis For Total Metals By EPA Method 6020B

Client ID:	IDW-03	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/07/19	Lab ID:	904556-07,08 x5
Date Analyzed:	05/07/19	Data File:	904556-07,08 x5.087
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Chromium	25.4
Copper	<25
Nickel	34.0
Zinc	42.8

Analysis For Total Metals By EPA Method 6020B

Client ID:	IDW-03	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/07/19	Lab ID:	904556-07,08
Date Analyzed:	05/09/19	Data File:	904556-07,08.044
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Cadmium	<0.5
Mercury	<0.25
Silver	<0.1 j

Analysis For Total Metals By EPA Method 6020B

Client ID:	IDW-03	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/07/19	Lab ID:	904556-07,08
Date Analyzed:	05/09/19	Data File:	904556-07,08.086
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Selenium	<0.5

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	NA	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/01/19	Lab ID:	I9-288 mb2
Date Analyzed:	05/01/19	Data File:	I9-288 mb2.145
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Barium	<1
Cadmium	<0.5
Chromium	<1
Lead	<1
Mercury	<0.25
Selenium	<0.5
Silver	<0.1 j

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	NA	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/07/19	Lab ID:	I9-297 mb2
Date Analyzed:	05/07/19	Data File:	I9-297 mb2.079
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Barium	<1
Chromium	<1
Copper	<5
Lead	<1
Nickel	<1
Zinc	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	NA	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/07/19	Lab ID:	I9-297 mb2
Date Analyzed:	05/09/19	Data File:	I9-297 mb2.041
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Cadmium	<0.5
Mercury	<0.25
Silver	<0.1 j

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	NA	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/07/19	Lab ID:	I9-297 mb2
Date Analyzed:	05/09/19	Data File:	I9-297 mb2.083
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Selenium	<0.5

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	02MW22-1.5-2FT	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	04/30/19	Lab ID:	904556-01 1/5
Date Analyzed:	05/01/19	Data File:	050120.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	86	31	163
Benzo(a)anthracene-d12	99	24	168

Compounds:	Concentration mg/kg (ppm) Dry Weight
Naphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01
1-Methylnaphthalene	<0.01
2-Methylnaphthalene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	04/30/19	Lab ID:	09-972 mb 1/5
Date Analyzed:	05/01/19	Data File:	050106.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	88	31	163
Benzo(a)anthracene-d12	100	24	168

Compounds:	Concentration mg/kg (ppm) Dry Weight
Naphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01
1-Methylnaphthalene	<0.01
2-Methylnaphthalene	<0.01

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	02MW22-1.5-2FT	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	04/30/19	Lab ID:	904556-01
Date Analyzed:	04/30/19	Data File:	043024.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	98	55	145
4-Bromofluorobenzene	106	65	139

Compounds:	Concentration mg/kg (ppm)
Hexane	<0.25
Methyl t-butyl ether (MTBE)	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,2-Dibromoethane (EDB)	<0.05
Benzene	<0.03
Toluene	<0.05
Ethylbenzene	<0.05
m,p-Xylene	<0.1
o-Xylene	<0.05
Naphthalene	<0.05

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	IDW-01	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/06/19	Lab ID:	904556-07
Date Analyzed:	05/06/19	Data File:	050613.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	97	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<0.5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Hexane	<0.25	o-Xylene	<0.05
Methylene chloride	<0.5	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.05	Bromoform	<0.05
1,1-Dichloroethane	<0.05	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.05	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<0.5	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.05	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.05	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.03	sec-Butylbenzene	<0.05
Trichloroethene	<0.02	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.05	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.05
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	IDW02	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/06/19	Lab ID:	904556-08
Date Analyzed:	05/06/19	Data File:	050614.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<0.5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Hexane	<0.25	o-Xylene	<0.05
Methylene chloride	<0.5	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.05	Bromoform	<0.05
1,1-Dichloroethane	<0.05	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.05	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<0.5	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.05	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.05	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.03	sec-Butylbenzene	<0.05
Trichloroethene	<0.02	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.05	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.05
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	IDW-03	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/06/19	Lab ID:	904556-07,08
Date Analyzed:	05/06/19	Data File:	050615.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<0.5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Hexane	<0.25	o-Xylene	<0.05
Methylene chloride	<0.5	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.05	Bromoform	<0.05
1,1-Dichloroethane	<0.05	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.05	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<0.5	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.05	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.05	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.03	sec-Butylbenzene	<0.05
Trichloroethene	<0.02	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.05	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.05
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	05/06/19	Lab ID:	09-1020 mb
Date Analyzed:	05/06/19	Data File:	050612.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<0.5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Hexane	<0.25	o-Xylene	<0.05
Methylene chloride	<0.5	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.05	Bromoform	<0.05
1,1-Dichloroethane	<0.05	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.05	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<0.5	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.05	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.05	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.03	sec-Butylbenzene	<0.05
Trichloroethene	<0.02	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.05	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.05
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	04/30/19	Lab ID:	09-926 mb
Date Analyzed:	04/30/19	Data File:	043009.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	98	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Hexane	<0.25
Methyl t-butyl ether (MTBE)	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,2-Dibromoethane (EDB)	<0.05
Benzene	<0.03
Toluene	<0.05
Ethylbenzene	<0.05
m,p-Xylene	<0.1
o-Xylene	<0.05
Naphthalene	<0.05

Date of Report: 05/14/19
Date Received: 04/26/19
Project: Cantera-TOC, F&BI 904556

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 905051-02 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	95	61-153

Date of Report: 05/14/19
Date Received: 04/26/19
Project: Cantera-TOC, F&BI 904556

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING METHOD 8021B AND NWTPH-Gx

Laboratory Code: 904415-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Toluene	mg/kg (ppm)	<0.02	<0.02	nm
Ethylbenzene	mg/kg (ppm)	<0.02	<0.02	nm
Xylenes	mg/kg (ppm)	<0.06	<0.06	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	86	69-120
Toluene	mg/kg (ppm)	0.5	91	70-117
Ethylbenzene	mg/kg (ppm)	0.5	95	65-123
Xylenes	mg/kg (ppm)	1.5	95	66-120
Gasoline	mg/kg (ppm)	20	95	71-131

Date of Report: 05/14/19
Date Received: 04/26/19
Project: Cantera-TOC, F&BI 904556

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 904563-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	98	88	63-146	11

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	86	79-144

Date of Report: 05/14/19
Date Received: 04/26/19
Project: Cantera-TOC, F&BI 904556

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 904556-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	91	89	63-146	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	89	79-144

Date of Report: 05/14/19
Date Received: 04/26/19
Project: Cantera-TOC, F&BI 904556

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 905082-14 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	<5	78 b	74 b	75-125	5 b
Barium	mg/kg (ppm)	50	109	82 b	72 b	75-125	13 b
Cadmium	mg/kg (ppm)	10	<2.5 j	94	94	75-125	0
Chromium	mg/kg (ppm)	50	21.7	83	83	75-125	0
Copper	mg/kg (ppm)	50	<25	86	86	75-125	0
Lead	mg/kg (ppm)	50	42.5	84	90	75-125	7
Mercury	mg/kg (ppm	5	<1.25 j	95	97	75-125	2
Nickel	mg/kg (ppm)	25	21.9	85	92	75-125	8
Selenium	mg/kg (ppm)	5	<2.5 j	84	86	75-125	2
Silver	mg/kg (ppm)	10	<0.5 j	95	97	75-125	2
Zinc	mg/kg (ppm)	50	84.6	77	80	75-125	4

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	87	80-120
Barium	mg/kg (ppm)	50	101	80-120
Cadmium	mg/kg (ppm)	10	101	80-120
Chromium	mg/kg (ppm)	50	98	80-120
Copper	mg/kg (ppm)	50	100	80-120
Lead	mg/kg (ppm)	50	104	80-120
Mercury	mg/kg (ppm)	5	101	80-120
Nickel	mg/kg (ppm)	25	105	80-120
Selenium	mg/kg (ppm)	5	101	80-120
Silver	mg/kg (ppm)	10	102	80-120
Zinc	mg/kg (ppm)	50	106	80-120

Date of Report: 05/14/19
Date Received: 04/26/19
Project: Cantera-TOC, F&BI 904556

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 904299-17 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	<5	97	99	75-125	2
Barium	mg/kg (ppm)	50	36.7	92	97	75-125	5
Cadmium	mg/kg (ppm)	5	<2.5	98	100	75-125	2
Chromium	mg/kg (ppm)	20	16.8	108	112	75-125	4
Lead	mg/kg (ppm)	10	<5	103	104	75-125	1
Mercury	mg/kg (ppm	5	<1.25	92	96	75-125	4
Selenium	mg/kg (ppm)	5	<2.5	91	95	75-125	4
Silver	mg/kg (ppm)	5	<0.5 j	96	101	75-125	5

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	101	80-120
Barium	mg/kg (ppm)	50	97	80-120
Cadmium	mg/kg (ppm)	5	101	80-120
Chromium	mg/kg (ppm)	20	117	80-120
Lead	mg/kg (ppm)	10	105	80-120
Mercury	mg/kg (ppm)	5	90	80-120
Selenium	mg/kg (ppm)	5	105	80-120
Silver	mg/kg (ppm)	5	109	80-120

Date of Report: 05/14/19
Date Received: 04/26/19
Project: Cantera-TOC, F&BI 904556

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: 904548-01 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Acceptance Criteria
Naphthalene	mg/kg (ppm)	0.17	<0.01	77	44-129
2-Methylnaphthalene	mg/kg (ppm)	0.17	<0.01	80	45-135
1-Methylnaphthalene	mg/kg (ppm)	0.17	<0.01	80	40-141
Acenaphthylene	mg/kg (ppm)	0.17	<0.01	82	52-121
Acenaphthene	mg/kg (ppm)	0.17	<0.01	82	51-123
Fluorene	mg/kg (ppm)	0.17	<0.01	82	37-137
Phenanthrene	mg/kg (ppm)	0.17	0.021	80	34-141
Anthracene	mg/kg (ppm)	0.17	<0.01	79	32-124
Fluoranthene	mg/kg (ppm)	0.17	0.041	79 b	16-160
Pyrene	mg/kg (ppm)	0.17	0.040	65 b	10-180
Benz(a)anthracene	mg/kg (ppm)	0.17	0.018	85	23-144
Chrysene	mg/kg (ppm)	0.17	0.028	82	32-149
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	0.030	79	23-176
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	0.010	81	42-139
Benzo(a)pyrene	mg/kg (ppm)	0.17	0.022	78	21-163
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	0.018	72	23-170
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	<0.01	77	31-146
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	0.018	67	37-133

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	mg/kg (ppm)	0.17	84	82	58-121	2
2-Methylnaphthalene	mg/kg (ppm)	0.17	85	83	58-123	2
1-Methylnaphthalene	mg/kg (ppm)	0.17	85	83	60-124	2
Acenaphthylene	mg/kg (ppm)	0.17	84	84	54-121	0
Acenaphthene	mg/kg (ppm)	0.17	85	85	54-123	0
Fluorene	mg/kg (ppm)	0.17	84	84	56-127	0
Phenanthrene	mg/kg (ppm)	0.17	86	85	55-122	1
Anthracene	mg/kg (ppm)	0.17	83	82	50-120	1
Fluoranthene	mg/kg (ppm)	0.17	83	81	54-129	2
Pyrene	mg/kg (ppm)	0.17	70	70	53-127	0
Benz(a)anthracene	mg/kg (ppm)	0.17	88	87	51-115	1
Chrysene	mg/kg (ppm)	0.17	90	88	55-129	2
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	84	79	56-123	6
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	82	82	54-131	0
Benzo(a)pyrene	mg/kg (ppm)	0.17	77	77	51-118	0
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	80	80	49-148	0
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	82	84	50-141	2
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	78	80	52-131	3

Date of Report: 05/14/19
Date Received: 04/26/19
Project: Cantera-TOC, F&BI 904556

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 904443-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Hexane	mg/kg (ppm)	2.5	<0.25	49	51	10-137	4
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	<0.05	76	77	21-145	1
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	86	86	12-160	0
Benzene	mg/kg (ppm)	2.5	<0.03	85	86	29-129	1
Toluene	mg/kg (ppm)	2.5	<0.05	85	85	35-130	0
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	<0.05	95	94	28-142	1
Ethylbenzene	mg/kg (ppm)	2.5	<0.05	88	88	32-137	0
m,p-Xylene	mg/kg (ppm)	5	<0.1	89	89	34-136	0
o-Xylene	mg/kg (ppm)	2.5	<0.05	82	83	33-134	1
Naphthalene	mg/kg (ppm)	2.5	<0.05	95	94	14-157	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Hexane	mg/kg (ppm)	2.5	80	43-142
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	88	60-123
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	90	56-135
Benzene	mg/kg (ppm)	2.5	93	68-114
Toluene	mg/kg (ppm)	2.5	88	66-126
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	93	74-132
Ethylbenzene	mg/kg (ppm)	2.5	92	64-123
m,p-Xylene	mg/kg (ppm)	5	93	78-122
o-Xylene	mg/kg (ppm)	2.5	90	77-124
Naphthalene	mg/kg (ppm)	2.5	100	63-140

Date of Report: 05/14/19
Date Received: 04/26/19
Project: Cantera-TOC, F&BI 904556

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 904556-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	2.5	<0.5	24	20	10-56	18
Chloromethane	mg/kg (ppm)	2.5	<0.5	54	48	10-90	12
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	59	51	10-91	15
Bromomethane	mg/kg (ppm)	2.5	<0.5	68	63	10-110	8
Chloroethane	mg/kg (ppm)	2.5	<0.5	71	63	10-101	12
Trichlorofluoromethane	mg/kg (ppm)	2.5	<0.5	68	61	10-95	11
Acetone	mg/kg (ppm)	12.5	<0.5	94	85	11-141	10
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	84	72	22-107	15
Hexane	mg/kg (ppm)	2.5	<0.1	61	54	10-95	12
Methylene chloride	mg/kg (ppm)	2.5	<0.5	85	73	14-128	15
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	<0.05	94	83	17-134	12
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	95	82	13-112	15
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	94	85	23-115	10
2,2-Dichloropropane	mg/kg (ppm)	2.5	<0.05	102	87	18-117	16
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	105	93	25-120	12
Chloroform	mg/kg (ppm)	2.5	<0.05	101	91	29-117	10
2-Butanone (MEK)	mg/kg (ppm)	12.5	<0.5	88	90	20-133	2
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	92	87	22-124	6
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	100	89	27-112	12
1,1-Dichloropropene	mg/kg (ppm)	2.5	<0.05	91	84	26-107	8
Carbon tetrachloride	mg/kg (ppm)	2.5	<0.05	104	91	28-126	13
Benzene	mg/kg (ppm)	2.5	<0.03	92	86	26-114	7
Trichloroethene	mg/kg (ppm)	2.5	<0.03	97	89	30-112	9
1,2-Dichloropropane	mg/kg (ppm)	2.5	<0.05	94	90	31-119	4
Bromodichloromethane	mg/kg (ppm)	2.5	<0.05	110	102	31-131	8
Dibromomethane	mg/kg (ppm)	2.5	<0.05	97	94	27-124	3
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	<0.5	100	101	16-147	1
cis-1,3-Dichloropropene	mg/kg (ppm)	2.5	<0.05	98	97	28-137	1
Toluene	mg/kg (ppm)	2.5	<0.05	98	91	34-112	7
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	<0.05	99	98	30-136	1
1,1,2-Trichloroethane	mg/kg (ppm)	2.5	<0.05	96	93	32-126	3
2-Hexanone	mg/kg (ppm)	12.5	<0.5	89	96	17-147	8
1,3-Dichloropropane	mg/kg (ppm)	2.5	<0.05	95	94	29-125	1
Tetrachloroethene	mg/kg (ppm)	2.5	<0.03	103	95	25-114	8
Dibromochloromethane	mg/kg (ppm)	2.5	<0.05	120	110	32-143	9
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	<0.05	99	98	32-126	1
Chlorobenzene	mg/kg (ppm)	2.5	<0.05	99	93	37-113	6
Ethylbenzene	mg/kg (ppm)	2.5	<0.05	97	91	34-115	6
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	<0.05	118	101	35-126	16
m,p-Xylene	mg/kg (ppm)	5	<0.1	101	95	25-125	6
o-Xylene	mg/kg (ppm)	2.5	<0.05	98	88	27-126	11
Styrene	mg/kg (ppm)	2.5	<0.05	101	97	39-121	4
Isopropylbenzene	mg/kg (ppm)	2.5	<0.05	108	95	34-123	13
Bromoform	mg/kg (ppm)	2.5	<0.05	123	109	18-155	12
n-Propylbenzene	mg/kg (ppm)	2.5	<0.05	101	96	31-120	5
Bromobenzene	mg/kg (ppm)	2.5	<0.05	100	97	40-115	3
1,3,5-Trimethylbenzene	mg/kg (ppm)	2.5	<0.05	107	100	24-130	7
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	<0.05	104	102	27-148	2
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	<0.05	94	97	33-123	3
2-Chlorotoluene	mg/kg (ppm)	2.5	<0.05	100	95	39-110	5
4-Chlorotoluene	mg/kg (ppm)	2.5	<0.05	99	97	39-111	2
tert-Butylbenzene	mg/kg (ppm)	2.5	<0.05	107	98	36-116	9
1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	<0.05	104	97	35-116	7
sec-Butylbenzene	mg/kg (ppm)	2.5	<0.05	108	99	33-118	9
p-Isopropyltoluene	mg/kg (ppm)	2.5	<0.05	108	99	32-119	9
1,3-Dichlorobenzene	mg/kg (ppm)	2.5	<0.05	104	96	38-111	8
1,4-Dichlorobenzene	mg/kg (ppm)	2.5	<0.05	103	95	39-109	8
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	<0.05	106	97	40-111	9
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	<0.5	112	102	47-127	9
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	<0.25	109	95	31-121	14
Hexachlorobutadiene	mg/kg (ppm)	2.5	<0.25	114	96	24-128	17
Naphthalene	mg/kg (ppm)	2.5	<0.05	105	92	24-139	13
1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	<0.25	104	92	35-117	12

Date of Report: 05/14/19
Date Received: 04/26/19
Project: Cantera-TOC, F&BI 904556

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Dichlorodifluoromethane	mg/kg (ppm)	2.5	56	10-76
Chloromethane	mg/kg (ppm)	2.5	69	34-98
Vinyl chloride	mg/kg (ppm)	2.5	76	42-107
Bromomethane	mg/kg (ppm)	2.5	77	46-113
Chloroethane	mg/kg (ppm)	2.5	79	47-115
Trichlorofluoromethane	mg/kg (ppm)	2.5	86	53-112
Acetone	mg/kg (ppm)	12.5	90	39-147
1,1-Dichloroethene	mg/kg (ppm)	2.5	86	65-110
Hexane	mg/kg (ppm)	2.5	89	55-107
Methylene chloride	mg/kg (ppm)	2.5	83	50-127
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	88	72-122
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	93	71-113
1,1-Dichloroethane	mg/kg (ppm)	2.5	96	74-109
2,2-Dichloropropane	mg/kg (ppm)	2.5	98	64-151
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	97	73-110
Chloroform	mg/kg (ppm)	2.5	96	76-110
2-Butanone (MEK)	mg/kg (ppm)	12.5	101	60-121
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	93	73-111
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	98	72-116
1,1-Dichloropropene	mg/kg (ppm)	2.5	93	72-112
Carbon tetrachloride	mg/kg (ppm)	2.5	101	67-123
Benzene	mg/kg (ppm)	2.5	93	72-106
Trichloroethene	mg/kg (ppm)	2.5	94	72-107
1,2-Dichloropropane	mg/kg (ppm)	2.5	96	74-115
Bromodichloromethane	mg/kg (ppm)	2.5	105	75-126
Dibromomethane	mg/kg (ppm)	2.5	98	76-116
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	103	80-128
cis-1,3-Dichloropropene	mg/kg (ppm)	2.5	101	71-138
Toluene	mg/kg (ppm)	2.5	96	74-111
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	101	77-135
1,1,2-Trichloroethane	mg/kg (ppm)	2.5	98	77-116
2-Hexanone	mg/kg (ppm)	12.5	104	70-129
1,3-Dichloropropane	mg/kg (ppm)	2.5	98	75-115
Tetrachloroethene	mg/kg (ppm)	2.5	97	73-111
Dibromochloromethane	mg/kg (ppm)	2.5	109	64-152
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	100	77-117
Chlorobenzene	mg/kg (ppm)	2.5	93	76-109
Ethylbenzene	mg/kg (ppm)	2.5	94	75-112
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	104	76-125
m,p-Xylene	mg/kg (ppm)	5	96	77-115
o-Xylene	mg/kg (ppm)	2.5	90	76-115
Styrene	mg/kg (ppm)	2.5	99	76-119
Isopropylbenzene	mg/kg (ppm)	2.5	98	76-120
Bromoform	mg/kg (ppm)	2.5	103	50-174
n-Propylbenzene	mg/kg (ppm)	2.5	92	77-115
Bromobenzene	mg/kg (ppm)	2.5	92	76-112
1,3,5-Trimethylbenzene	mg/kg (ppm)	2.5	94	77-121
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	97	74-121
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	90	74-116
2-Chlorotoluene	mg/kg (ppm)	2.5	90	75-113
4-Chlorotoluene	mg/kg (ppm)	2.5	92	77-115
tert-Butylbenzene	mg/kg (ppm)	2.5	93	77-123
1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	93	77-119
sec-Butylbenzene	mg/kg (ppm)	2.5	95	78-120
p-Isopropyltoluene	mg/kg (ppm)	2.5	95	77-120
1,3-Dichlorobenzene	mg/kg (ppm)	2.5	96	76-112
1,4-Dichlorobenzene	mg/kg (ppm)	2.5	95	74-109
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	93	75-114
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	93	68-122
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	90	75-122
Hexachlorobutadiene	mg/kg (ppm)	2.5	91	74-130
Naphthalene	mg/kg (ppm)	2.5	87	73-122
1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	86	75-117

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

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Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 904556
Work Order Number: 1904473

May 13, 2019

Attention Michael Erdahl:

Fremont Analytical, Inc. received 1 sample(s) on 4/29/2019 for the analyses presented in the following report.

Extractable Petroleum Hydrocarbons by NWEPH
Sample Moisture (Percent Moisture)
Volatile Petroleum Hydrocarbons by NWVPH

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

Date: *05/13/2019*

CLIENT: Friedman & Bruya
Project: 904556
Work Order: 1904473

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1904473-001	02MW22-1.5-2FT	04/25/2019 11:20 AM	04/29/2019 2:31 PM

Case Narrative

WO#: **1904473**
Date: **5/13/2019**

CLIENT: Friedman & Bruya
Project: 904556

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **1904473**
Date Reported: **5/13/2019**

Client: Friedman & Bruya
Collection Date: 4/25/2019 11:20:00 AM
Project: 904556
Lab ID: 1904473-001
Matrix: Soil
Client Sample ID: **02MW22-1.5-2FT**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 24408		Analyst: DW
Aliphatic Hydrocarbon (C8-C10)	29.8	21.1		mg/Kg-dry	1	5/9/2019 5:02:00 PM
Aliphatic Hydrocarbon (C10-C12)	15.5	10.6		mg/Kg-dry	1	5/9/2019 5:02:00 PM
Aliphatic Hydrocarbon (C12-C16)	ND	10.6		mg/Kg-dry	1	5/9/2019 5:02:00 PM
Aliphatic Hydrocarbon (C16-C21)	ND	10.6		mg/Kg-dry	1	5/9/2019 5:02:00 PM
Aliphatic Hydrocarbon (C21-C34)	ND	10.6		mg/Kg-dry	1	5/9/2019 5:02:00 PM
Aromatic Hydrocarbon (C8-C10)	ND	10.6		mg/Kg-dry	1	5/10/2019 1:35:00 AM
Aromatic Hydrocarbon (C10-C12)	ND	10.6		mg/Kg-dry	1	5/10/2019 1:35:00 AM
Aromatic Hydrocarbon (C12-C16)	ND	10.6		mg/Kg-dry	1	5/10/2019 1:35:00 AM
Aromatic Hydrocarbon (C16-C21)	ND	10.6		mg/Kg-dry	1	5/10/2019 1:35:00 AM
Aromatic Hydrocarbon (C21-C34)	ND	10.6		mg/Kg-dry	1	5/10/2019 1:35:00 AM
Surr: 1-Chlorooctadecane	70.2	60 - 140		%Rec	1	5/9/2019 5:02:00 PM
Surr: o-Terphenyl	60.9	60 - 140		%Rec	1	5/10/2019 1:35:00 AM
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 24373		Analyst: CR
Aliphatic Hydrocarbon (C5-C6)	ND	1.42		mg/Kg-dry	1	5/2/2019 7:00:09 AM
Aliphatic Hydrocarbon (C6-C8)	8.27	2.02		mg/Kg-dry	1	5/2/2019 7:00:09 AM
Aliphatic Hydrocarbon (C8-C10)	33.5	1.13		mg/Kg-dry	1	5/2/2019 7:00:09 AM
Aliphatic Hydrocarbon (C10-C12)	24.6	1.21		mg/Kg-dry	1	5/2/2019 7:00:09 AM
Aromatic Hydrocarbon (C8-C10)	41.3	2.43		mg/Kg-dry	1	5/2/2019 7:00:09 AM
Aromatic Hydrocarbon (C10-C12)	20.7	0.485		mg/Kg-dry	1	5/2/2019 7:00:09 AM
Aromatic Hydrocarbon (C12-C13)	15.8	5.66		mg/Kg-dry	1	5/2/2019 7:00:09 AM
Surr: 1,4-Difluorobenzene	110	65 - 140		%Rec	1	5/2/2019 7:00:09 AM
Surr: Bromofluorobenzene	116	65 - 140		%Rec	1	5/2/2019 7:00:09 AM
Sample Moisture (Percent Moisture)				Batch ID: R51128		Analyst: CG
Percent Moisture	19.5	0.500		wt%	1	5/2/2019 1:15:32 PM

Work Order: 1904473
CLIENT: Friedman & Bruya
Project: 904556

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **MB-24408** SampType: **MBLK** Units: **mg/Kg** Prep Date: **5/3/2019** RunNo: **51407**
Client ID: **MBLKS** Batch ID: **24408** Analysis Date: **5/9/2019** SeqNo: **1012432**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	ND	20.0									
Aliphatic Hydrocarbon (C10-C12)	ND	10.0									
Aliphatic Hydrocarbon (C12-C16)	ND	10.0									
Aliphatic Hydrocarbon (C16-C21)	ND	10.0									
Aliphatic Hydrocarbon (C21-C34)	ND	10.0									
Surr: 1-Chlorooctadecane	15.6		20.00		77.8	60	140				

Sample ID: **1904473-001ADUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **5/3/2019** RunNo: **51407**
Client ID: **02MW22-1.5-2FT** Batch ID: **24408** Analysis Date: **5/9/2019** SeqNo: **1012430**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	24.3	22.1						29.81	20.2	25	
Aliphatic Hydrocarbon (C10-C12)	15.9	11.0						15.48	2.93	25	
Aliphatic Hydrocarbon (C12-C16)	ND	11.0						0		25	
Aliphatic Hydrocarbon (C16-C21)	ND	11.0						0		25	
Aliphatic Hydrocarbon (C21-C34)	ND	11.0						0		25	
Surr: 1-Chlorooctadecane	15.6		22.07		70.5	60	140		0		

Sample ID: **LCS-24408** SampType: **LCS** Units: **mg/Kg** Prep Date: **5/3/2019** RunNo: **51407**
Client ID: **LCSS** Batch ID: **24408** Analysis Date: **5/9/2019** SeqNo: **1012435**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	19.6	20.0	25.00	0	78.4	70	130				
Aliphatic Hydrocarbon (C10-C12)	23.3	10.0	25.00	0	93.3	70	130				
Aliphatic Hydrocarbon (C12-C16)	26.7	10.0	25.00	0	107	70	130				
Aliphatic Hydrocarbon (C16-C21)	28.9	10.0	25.00	0	116	70	130				
Aliphatic Hydrocarbon (C21-C34)	41.1	10.0	50.00	0	82.2	70	130				
Surr: 1-Chlorooctadecane	17.7		20.00		88.6	60	140				

Work Order: 1904473
CLIENT: Friedman & Bruya
Project: 904556

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **1904473-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **5/3/2019** RunNo: **51407**
Client ID: **02MW22-1.5-2FT** Batch ID: **24408** Analysis Date: **5/9/2019** SeqNo: **1012433**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	50.5	21.0	26.30	29.81	78.5	70	130				
Aliphatic Hydrocarbon (C10-C12)	49.2	10.5	26.30	15.48	128	70	130				
Aliphatic Hydrocarbon (C12-C16)	24.1	10.5	26.30	0	91.8	70	130				
Aliphatic Hydrocarbon (C16-C21)	22.7	10.5	26.30	3.066	74.7	70	130				
Aliphatic Hydrocarbon (C21-C34)	54.8	10.5	52.61	8.721	87.6	70	130				
Surr: 1-Chlorooctadecane	16.1		21.04		76.6	60	140				

Sample ID: **1904473-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **5/3/2019** RunNo: **51407**
Client ID: **02MW22-1.5-2FT** Batch ID: **24408** Analysis Date: **5/9/2019** SeqNo: **1012434**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	38.5	24.4	30.55	29.81	28.4	70	130	50.47	26.9	30	S
Aliphatic Hydrocarbon (C10-C12)	50.6	12.2	30.55	15.48	115	70	130	49.23	2.70	30	
Aliphatic Hydrocarbon (C12-C16)	56.4	12.2	30.55	0	185	70	130	24.14	80.0	30	RS
Aliphatic Hydrocarbon (C16-C21)	16.7	12.2	30.55	3.066	44.7	70	130	22.71	30.3	30	S
Aliphatic Hydrocarbon (C21-C34)	42.7	12.2	61.09	8.721	55.7	70	130	54.79	24.7	30	S
Surr: 1-Chlorooctadecane	17.4		24.44		71.2	60	140		0		

NOTES:
S - Outlying spike recovery(ies) observed. A duplicate analysis was performed and recovered within range.
R - High RPD observed. The method is in control as indicated by the LCS.

Sample ID: **MB-24408** SampType: **MBLK** Units: **mg/Kg** Prep Date: **5/3/2019** RunNo: **51407**
Client ID: **MBLKS** Batch ID: **24408** Analysis Date: **5/10/2019** SeqNo: **1012476**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C8-C10)	ND	10.0									
Aromatic Hydrocarbon (C10-C12)	ND	10.0									
Aromatic Hydrocarbon (C12-C16)	ND	10.0									
Aromatic Hydrocarbon (C16-C21)	ND	10.0									
Aromatic Hydrocarbon (C21-C34)	ND	10.0									
Surr: o-Terphenyl	16.3		20.00		81.3	60	140				

Work Order: 1904473
CLIENT: Friedman & Bruya
Project: 904556

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **MB-24408** SampType: **MBLK** Units: **mg/Kg** Prep Date: **5/3/2019** RunNo: **51407**
Client ID: **MBLKS** Batch ID: **24408** Analysis Date: **5/10/2019** SeqNo: **1012476**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID: **1904473-001ADUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **5/3/2019** RunNo: **51407**
Client ID: **02MW22-1.5-2FT** Batch ID: **24408** Analysis Date: **5/10/2019** SeqNo: **1012474**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C8-C10)	ND	11.0						0		25	
Aromatic Hydrocarbon (C10-C12)	ND	11.0						0		25	
Aromatic Hydrocarbon (C12-C16)	ND	11.0						0		25	
Aromatic Hydrocarbon (C16-C21)	ND	11.0						0		25	
Aromatic Hydrocarbon (C21-C34)	ND	11.0						0		25	
Surr: o-Terphenyl	13.8		22.07		62.5	60	140		0		

Sample ID: **LCS-24408** SampType: **LCS** Units: **mg/Kg** Prep Date: **5/3/2019** RunNo: **51407**
Client ID: **LCSS** Batch ID: **24408** Analysis Date: **5/10/2019** SeqNo: **1012475**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C8-C10)	23.5	10.0	25.00	0	94.0	70	130				
Aromatic Hydrocarbon (C10-C12)	17.7	10.0	25.00	0	71.0	70	130				
Aromatic Hydrocarbon (C12-C16)	22.6	10.0	25.00	0	90.3	70	130				
Aromatic Hydrocarbon (C16-C21)	25.3	10.0	25.00	0	101	70	130				
Aromatic Hydrocarbon (C21-C34)	20.7	10.0	25.00	0	82.7	70	130				
Surr: o-Terphenyl	16.0		20.00		80.1	60	140				

Sample ID: **1904473-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **5/3/2019** RunNo: **51407**
Client ID: **02MW22-1.5-2FT** Batch ID: **24408** Analysis Date: **5/10/2019** SeqNo: **1012477**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C8-C10)	12.2	10.5	26.30	0	46.4	70	130				S
Aromatic Hydrocarbon (C10-C12)	16.4	10.5	26.30	0	62.5	70	130				S

Work Order: 1904473
CLIENT: Friedman & Bruya
Project: 904556

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **1904473-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **5/3/2019** RunNo: **51407**
Client ID: **02MW22-1.5-2FT** Batch ID: **24408** Analysis Date: **5/10/2019** SeqNo: **1012477**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C12-C16)	21.1	10.5	26.30	0	80.4	70	130				
Aromatic Hydrocarbon (C16-C21)	26.5	10.5	26.30	0	101	70	130				
Aromatic Hydrocarbon (C21-C34)	28.2	10.5	26.30	0	107	70	130				
Surr: o-Terphenyl	12.4		21.04		59.1	60	140				S

NOTES:
S - Spike recovery indicates a possible matrix effect. The method is in control as indicated by the Laboratory Control Sample (LCS).
S - Outlying surrogate recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.

Sample ID: **1904473-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **5/3/2019** RunNo: **51407**
Client ID: **02MW22-1.5-2FT** Batch ID: **24408** Analysis Date: **5/10/2019** SeqNo: **1012478**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C8-C10)	24.4	12.2	30.55	0	80.0	70	130	12.22	66.7	30	R
Aromatic Hydrocarbon (C10-C12)	17.8	12.2	30.55	0	58.2	70	130	16.43	7.87	30	S
Aromatic Hydrocarbon (C12-C16)	22.2	12.2	30.55	0	72.8	70	130	21.14	5.10	30	
Aromatic Hydrocarbon (C16-C21)	25.8	12.2	30.55	0	84.6	70	130	26.46	2.41	30	
Aromatic Hydrocarbon (C21-C34)	32.7	12.2	30.55	0	107	70	130	28.16	14.9	30	
Surr: o-Terphenyl	13.9		24.44		56.9	60	140		0		S

NOTES:
S - Spike recovery indicates a possible matrix effect. The method is in control as indicated by the Laboratory Control Sample (LCS).
S - Outlying surrogate recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.
R - High RPD observed. The method is in control as indicated by the LCS.

Work Order: 1904473
CLIENT: Friedman & Bruya
Project: 904556

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **LCS-24373**	SampType: **LCS**	Units: **mg/Kg**	Prep Date: **5/1/2019**	RunNo: **51208**
Client ID: **LCSS**	Batch ID: **24373**		Analysis Date: **5/2/2019**	SeqNo: **1007338**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	30.2	1.75	30.00	0	101	70	130				
Aliphatic Hydrocarbon (C6-C8)	10.0	2.50	10.00	0	100	70	130				
Aliphatic Hydrocarbon (C8-C10)	9.82	1.40	10.00	0	98.2	70	130				
Aliphatic Hydrocarbon (C10-C12)	9.69	1.50	10.00	0	96.9	70	130				
Aromatic Hydrocarbon (C8-C10)	43.5	3.00	40.00	0	109	70	130				
Aromatic Hydrocarbon (C10-C12)	10.7	0.600	10.00	0	107	70	130				
Aromatic Hydrocarbon (C12-C13)	9.72	7.00	10.00	0	97.2	70	130				
Surr: 1,4-Difluorobenzene	2.79		2.500		112	65	140				
Surr: Bromofluorobenzene	2.78		2.500		111	65	140				

Sample ID: **LCSD-24373**	SampType: **LCSD**	Units: **mg/Kg**	Prep Date: **5/1/2019**	RunNo: **51208**
Client ID: **LCSS02**	Batch ID: **24373**		Analysis Date: **5/2/2019**	SeqNo: **1007339**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	30.3	1.75	30.00	0	101	70	130	30.24	0.0605	20	
Aliphatic Hydrocarbon (C6-C8)	10.2	2.50	10.00	0	102	70	130	10.01	1.98	20	
Aliphatic Hydrocarbon (C8-C10)	9.69	1.40	10.00	0	96.9	70	130	9.823	1.35	20	
Aliphatic Hydrocarbon (C10-C12)	9.44	1.50	10.00	0	94.4	70	130	9.692	2.64	20	
Aromatic Hydrocarbon (C8-C10)	42.7	3.00	40.00	0	107	70	130	43.53	2.00	20	
Aromatic Hydrocarbon (C10-C12)	10.7	0.600	10.00	0	107	70	130	10.74	0.0554	20	
Aromatic Hydrocarbon (C12-C13)	10.5	7.00	10.00	0	105	70	130	9.723	7.63	20	
Surr: 1,4-Difluorobenzene	2.78		2.500		111	65	140		0		
Surr: Bromofluorobenzene	2.76		2.500		110	65	140		0		

Sample ID: **MB-24373**	SampType: **MBLK**	Units: **mg/Kg**	Prep Date: **5/1/2019**	RunNo: **51208**
Client ID: **MBLKS**	Batch ID: **24373**		Analysis Date: **5/2/2019**	SeqNo: **1007340**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	ND	1.75		0	0						
Aliphatic Hydrocarbon (C6-C8)	ND	2.50		0	0						

Work Order: 1904473
CLIENT: Friedman & Bruya
Project: 904556

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **MB-24373** SampType: **MBLK** Units: **mg/Kg** Prep Date: **5/1/2019** RunNo: **51208**
Client ID: **MBLKS** Batch ID: **24373** Analysis Date: **5/2/2019** SeqNo: **1007340**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	ND	1.40		0	0						
Aliphatic Hydrocarbon (C10-C12)	ND	1.50		0	0						
Aromatic Hydrocarbon (C8-C10)	ND	3.00		0	0						
Aromatic Hydrocarbon (C10-C12)	ND	0.600		0	0						
Aromatic Hydrocarbon (C12-C13)	ND	7.00		0	0						
Surr: 1,4-Difluorobenzene	2.64		2.500		106	65	140				
Surr: Bromofluorobenzene	2.71		2.500		108	65	140				

Sample ID: **1904473-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **5/1/2019** RunNo: **51208**
Client ID: **02MW22-1.5-2FT** Batch ID: **24373** Analysis Date: **5/2/2019** SeqNo: **1007333**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	ND	14.2		0	0			0		25	D
Aliphatic Hydrocarbon (C6-C8)	ND	20.2		0	0			0		25	D
Aliphatic Hydrocarbon (C8-C10)	19.9	11.3		0	0			33.47	50.9	25	DR
Aliphatic Hydrocarbon (C10-C12)	ND	12.1		0	0			24.61	200	25	DR
Aromatic Hydrocarbon (C8-C10)	24.9	24.3		0	0			41.26	49.3	25	D
Aromatic Hydrocarbon (C10-C12)	18.5	4.85		0	0			20.70	11.5	25	D
Aromatic Hydrocarbon (C12-C13)	ND	56.6		0	0			0		25	D
Surr: 1,4-Difluorobenzene	21.9		20.23		108	65	140		0		D
Surr: Bromofluorobenzene	23.2		20.23		115	65	140		0		D

NOTES:
R - High RPD observed. The method is in control as indicated by the LCS.

Work Order: 1904473
CLIENT: Friedman & Bruya
Project: 904556

QC SUMMARY REPORT

Sample Moisture (Percent Moisture)

Sample ID: **1905005-001ADUP**	SampType: **DUP**			Units: **wt%**		Prep Date: **5/2/2019**		RunNo: **51128**		
Client ID: **BATCH**	Batch ID: **R51128**					Analysis Date: **5/2/2019**		SeqNo: **1005601**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	15.2	0.500						15.25	0.209	20	

Sample ID: **1904444-001ADUP**	SampType: **DUP**			Units: **wt%**		Prep Date: **5/2/2019**		RunNo: **51128**		
Client ID: **BATCH**	Batch ID: **R51128**					Analysis Date: **5/2/2019**		SeqNo: **1005611**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	17.4	0.500						16.21	6.86	20	

Sample Log-In Check List

Client Name:	**FB**	Work Order Number:	**1904473**
Logged by:	**Brianna Barnes**	Date Received:	**4/29/2019 2:31:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	FedEx		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☑	Not Required ☐
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes ☐	No ☑	NA ☐
		Please refer to item information.		
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☑	No ☐	NA ☐
				MeOH added to 001B.
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp °C
Cooler	11.1
Sample	10.3

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

1904473

Send Report To Michael Erdahl
Company Friedman and Bruya, Inc.
Address 3012 16th Ave W
City, State, ZIP Seattle, WA 98119
Phone # (206) 285-8282 Fax # (206) 283-5044

SUBCONTRACTER Fremont

PROJECT NAME/NO.	PO #
904556	B-231

REMARKS

Please Email Results

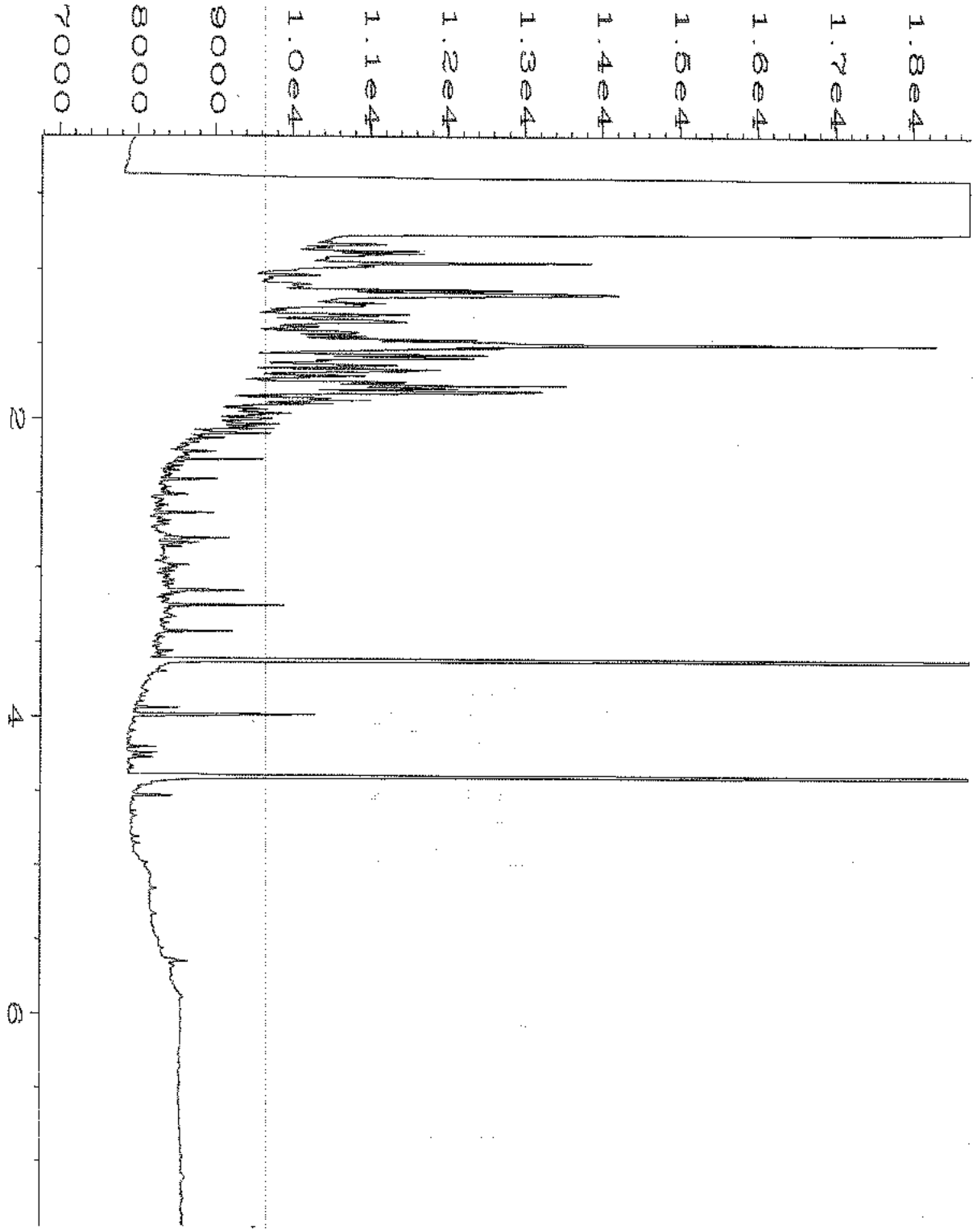
TURNAROUND TIME
☒ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: Dioxins/Furans	EPH	VPH							Notes
02MW22-1.5-2FT		4/25/19	1120	Soil			x	x							+NoTargets

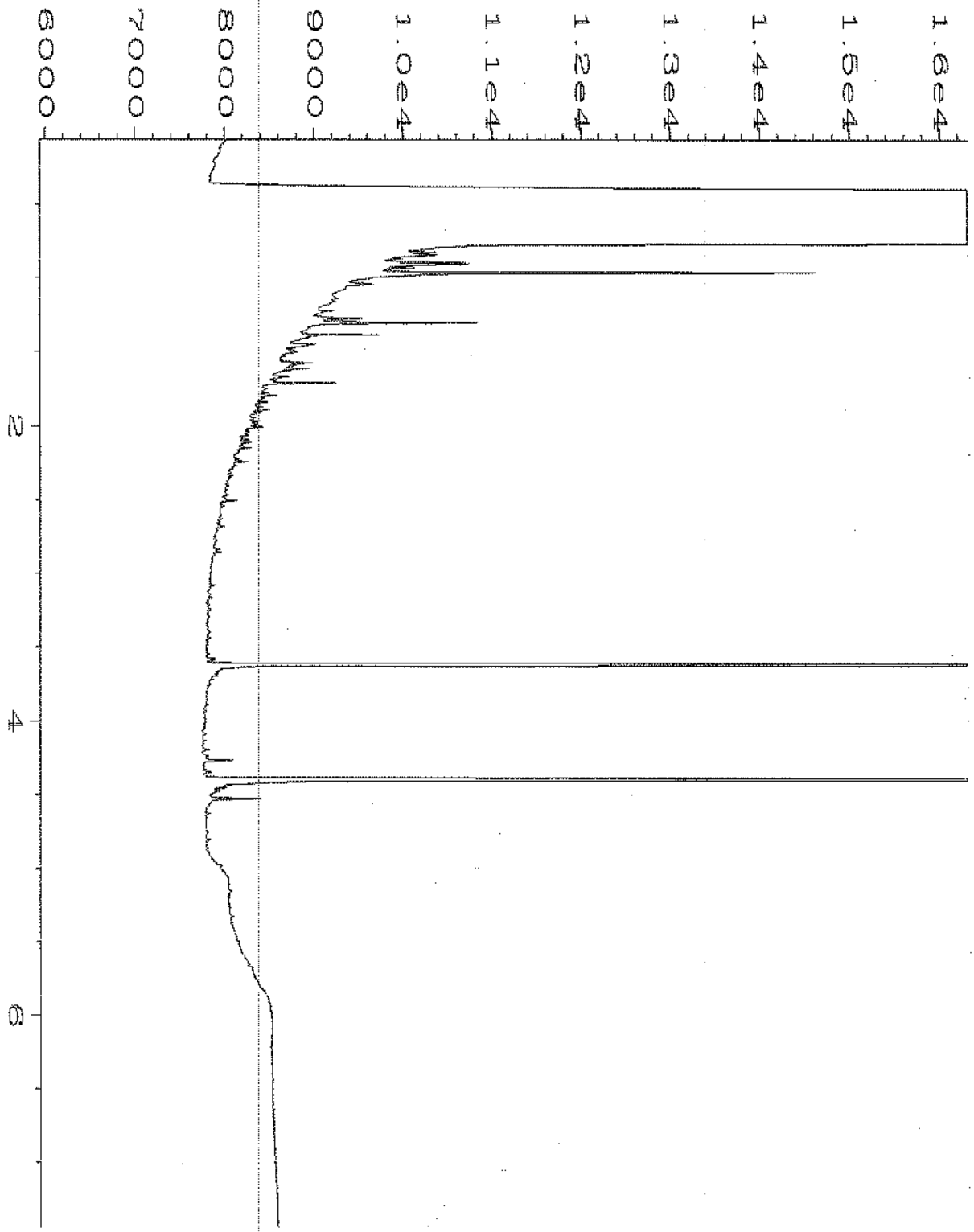
Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	4/29/19	13:00
Received by:	Casey O'Keefe	Casey O'Keefe	FAI	4/29/19	1431
Relinquished by:					
Received by:					



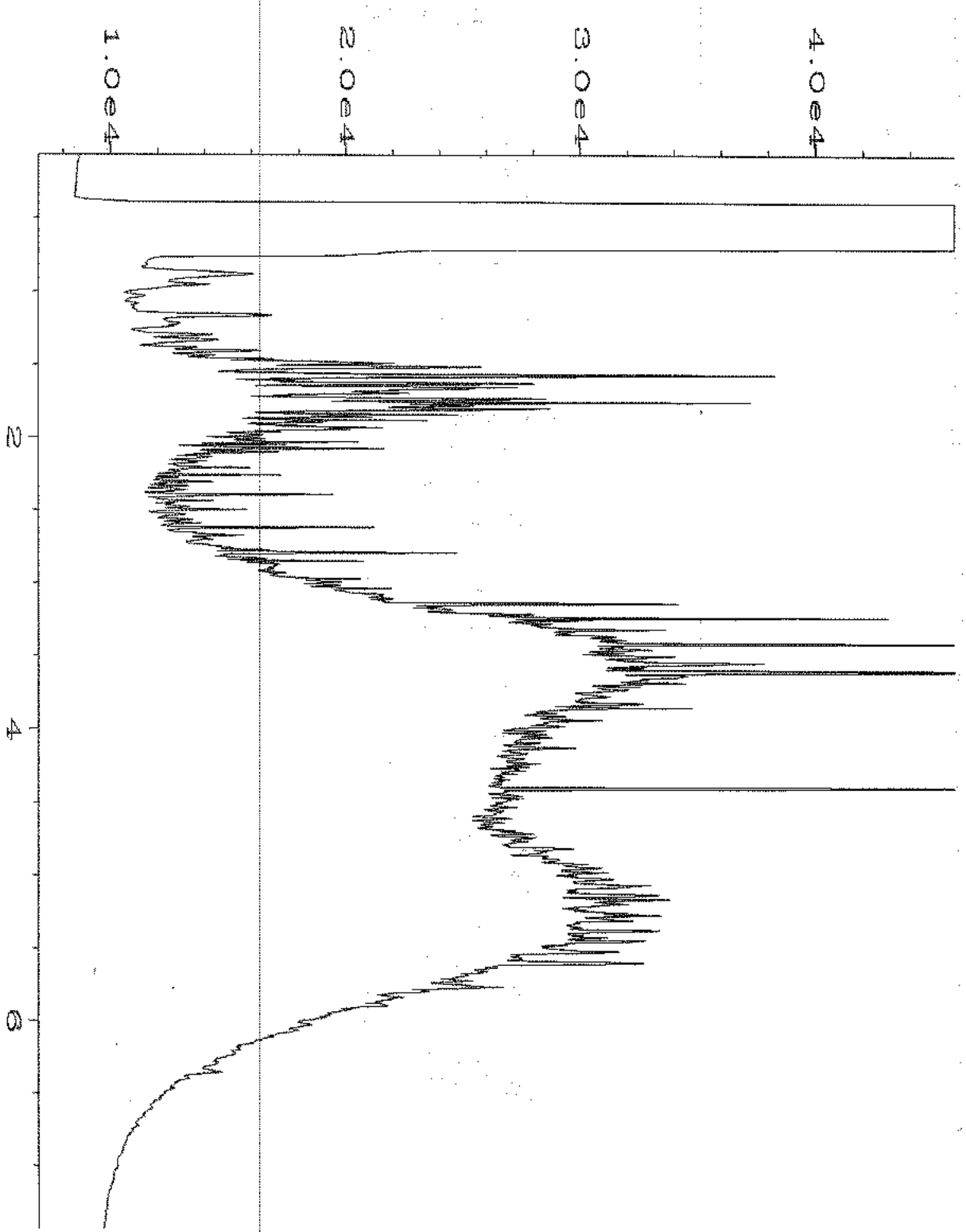
Data File Name : C:\HPCHEM\1\DATA\04-29-19\068F1701.D
Operator : TL
Instrument : GC1
Sample Name : 904556-01
Run Time Bar Code:
Acquired on : 29 Apr 19 11:44 PM
Report Created on: 30 Apr 19 10:09 AM

Page Number : 1
Vial Number : 68
Injection Number : 1
Sequence Line : 17
Instrument Method: DX.MTH
Analysis Method : DX.MTH

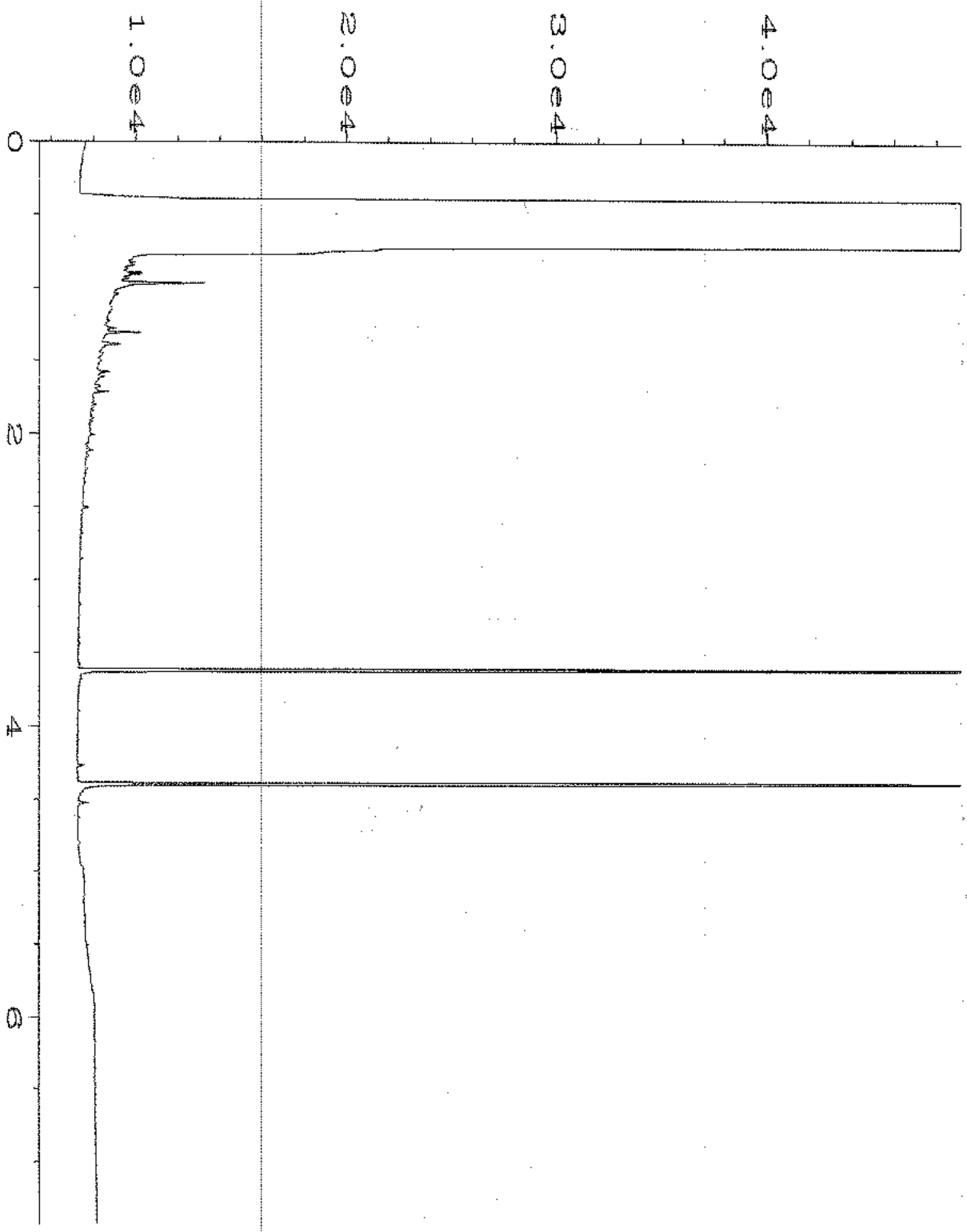


Data File Name : C:\HPCHEM\1\DATA\04-29-19\069F1701.D
Operator : TL
Instrument : GC1
Sample Name : 904556-02
Run Time Bar Code:
Acquired on : 29 Apr 19 11:56 PM
Report Created on: 30 Apr 19 10:09 AM

Page Number : 1
Vial Number : 69
Injection Number : 1
Sequence Line : 17
Instrument Method: DX.MTH
Analysis Method : DX.MTH

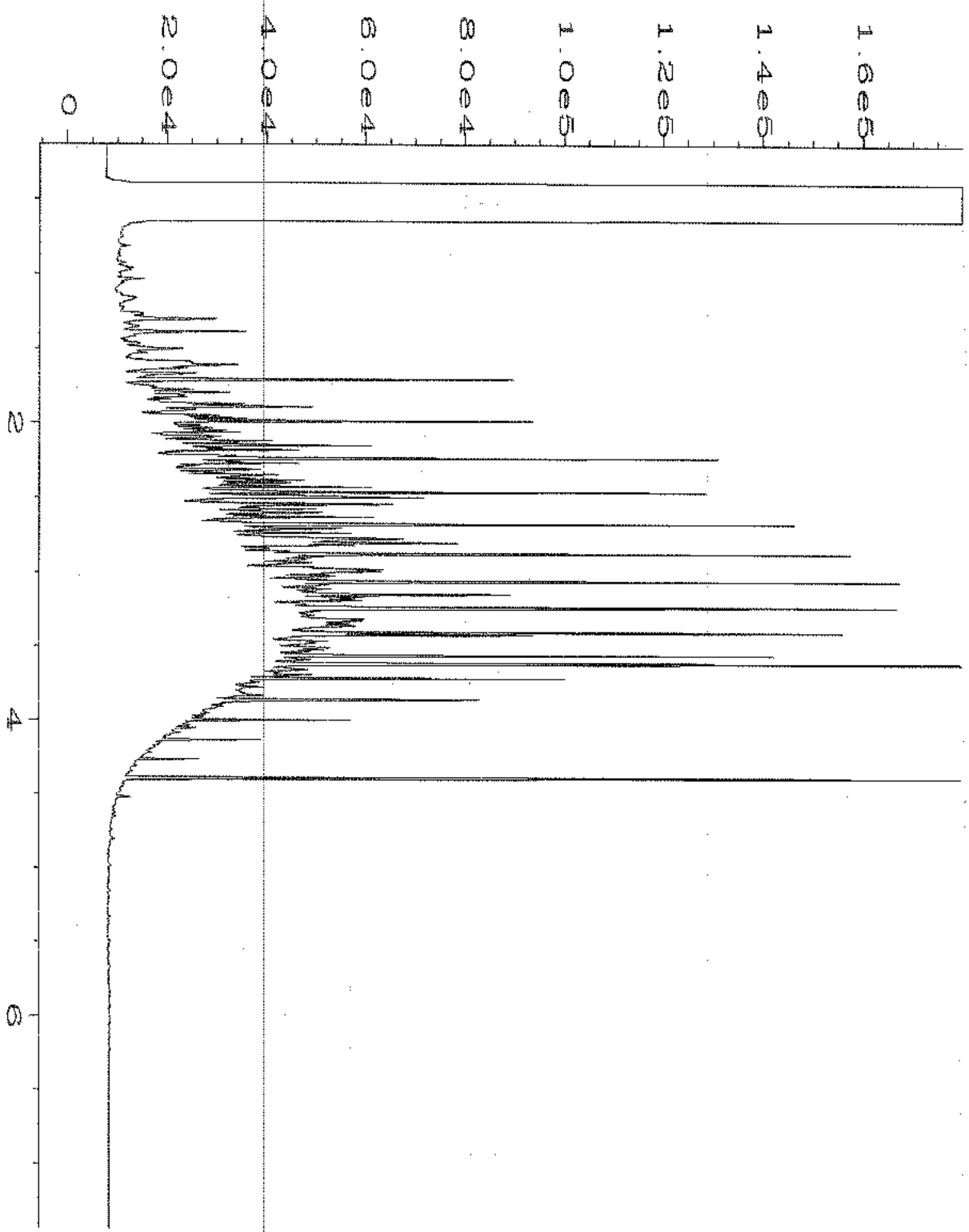


Data File Name	: C:\HPCHEM\1\DATA\04-30-19\008F0401.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 8
Sample Name	: 904556-03 rr	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 4
Acquired on	: 30 Apr 19 09:40 AM	Instrument Method	: DX.MTH
Report Created on	: 30 Apr 19 01:56 PM	Analysis Method	: DX.MTH



Data File Name : C:\HPCHEM\1\DATA\04-29-19\048F1301.D
Operator : TL
Instrument : GC1
Sample Name : 09-978 mb
Run Time Bar Code:
Acquired on : 29 Apr 19 07:15 PM
Report Created on: 30 Apr 19 10:05 AM

Page Number : 1
Vial Number : 48
Injection Number : 1
Sequence Line : 13
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name	: C:\HPCHEM\1\DATA\04-29-19\003F1601.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 3
Sample Name	: 500 Dx 56-131E	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 16
Acquired on	: 29 Apr 19 11:33 PM	Instrument Method	: DX.MTH
Report Created on:	30 Apr 19 10:06 AM	Analysis Method	: DX.MTH

904556

SAMPLE CHAIN OF CUSTODY

ME 04-26-19

Page # 1 of 1 (COC 3 / 159)

Report To Lynn Grochala

Company Floyd | Snider

Address 601 Union St, Ste 600

City, State, ZIP Seattle, WA 98101

Phone 206-292-2078 Email lynn.grochala@floydsnider.com

SAMPLERS (*signature*)

PROJECT NAME: Cantera - TOC

PO #

REMARKS

INVOICE TO: Cantera / Pioneer

TURNAROUND TIME
- [x] Standard Turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Archive Samples
- [ ] Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	VPH targets	EPH targets	EPH/VPH	1202+8	Notes
																	⊗ - per LC - 4/15
02MW22-1.5-2FT	01 A-E	4/25/19	1120	Soil	10		X	X					X	X	X	X	✓ - RCRA 8
02MW22-3.5-4FT	02 A-E		1150		5		X	X	X								TCn, N, Zn; Cover IDW-01 & IDW-03
02MW20-1.5-2FT	03		1505		5		X	X	X								
SS-02-0-0.5FT	04	4/26/19	0905		1											X	to IDW 02
SS-03-0.25-0.75FT	05		1140		1											X	5/16
SS-01-0-0.4FT	06		1200		1											X	
IDW-01	07 A-E		1610		5		✓	✓		✓						✓	HOLD
IDW 02	08		1615		5		✓	✓		✓						✓	HOLD
IDW-03		N/A	N/A	S			✓	✓		✓							composite - 07 & - 08 4/26

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	Floyd Snider	4/26/19	1730
Received by:	Erica Nuno	F&B	4/26/19	1730
Relinquished by:				
Received by:		Samples received at 4 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
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June 13, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the additional results from the testing of material submitted on April 26, 2019 from the Cantera-TOC, F&BI 904556 project. There are 5 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0613R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 26, 2019 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera-TOC, F&BI 904556 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
904556 -01	02MW22-1.5-2FT
904556 -02	02MW22-3.5-4FT
904556 -03	02-MW20-1.5-2FT
904556 -04	SS-02-0-0.5FT
904556 -05	SS-03-0.25-0.75FT
904556 -06	SS-01-0-0.4FT
904556 -07	IDW-01
904556 -08	IDW02

All quality control requirements were acceptable.

ZZZAnalysis For Total Metals By EPA Method 6020B

Client ID:	02MW22-1.5-2FT	Client:	Floyd-Snider
Date Received:	04/26/19	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	06/06/19	Lab ID:	904556-01
Date Analyzed:	06/12/19	Data File:	904556-01.034
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	1.45
Barium	83.9
Cadmium	<0.5
Chromium	17.9
Lead	10.3
Mercury	<0.25
Selenium	<0.5
Silver	<0.1 j

ZZZAnalysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 904556
Date Extracted:	06/06/19	Lab ID:	I9-356 mb
Date Analyzed:	06/12/19	Data File:	I9-356 mb.033
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Barium	<1
Cadmium	<0.5
Chromium	<1
Lead	<1
Mercury	<0.25
Selenium	<0.5
Silver	<0.1 j

Date of Report: 06/13/19
Date Received: 04/26/19
Project: Cantera-TOC, F&BI 904556

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 906077-03 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	<1	97	100	75-125	3
Barium	mg/kg (ppm)	50	21.5	101	114	75-125	12
Cadmium	mg/kg (ppm)	10	<0.5	104	106	75-125	2
Chromium	mg/kg (ppm)	50	12.8	100	114	75-125	13
Lead	mg/kg (ppm)	50	1.94	106	108	75-125	2
Mercury	mg/kg (ppm	5	<0.25	101	91	75-125	10
Selenium	mg/kg (ppm)	5	<0.5	98	101	75-125	3
Silver	mg/kg (ppm)	10	<0.1 j ca	92	95	75-125	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	100	80-120
Barium	mg/kg (ppm)	50	101	80-120
Cadmium	mg/kg (ppm)	10	104	80-120
Chromium	mg/kg (ppm)	50	107	80-120
Lead	mg/kg (ppm)	50	108	80-120
Mercury	mg/kg (ppm)	5	97	80-120
Selenium	mg/kg (ppm)	5	108	80-120
Silver	mg/kg (ppm)	10	96	80-120

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

904556

SAMPLE CHAIN OF CUSTODY

ME 04-26-19

Page # 1 of 1 (COC 3 / 159)

Report To Lynn Grochala

Company Floyd | Snider

Address 601 Union St, Ste 600

City, State, ZIP Seattle, WA 98101

Phone 206-292-2078 Email lynn.grochala@floydsnider.com

SAMPLERS (*signature*)

PROJECT NAME: Cantera - TOC

PO #

REMARKS

INVOICE TO: Cantera / Pioneer

TURNAROUND TIME
- [x] Standard Turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Archive Samples
- [ ] Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	VPH targets	EPH targets	EPH/VPH	1202+8	Notes
																	⊗ - per LC - 4/15
02MW22-1.5-2FT	01 A-E	4/25/19	1120	Soil	10		X	X					X	X	X	X	✓ - RCRA 8
02MW22-3.5-4FT	02 A-E		1150		5		X	X	X								TCn, N, Zn; Cover IDW-01 & IDW-03
02MW20-1.5-2FT	03		1505		5		X	X	X								
SS-02-0-0.5FT	04	4/26/19	0905		1											X	to IDW 02
SS-03-0.25-0.75FT	05		1140		1											X	5/16
SS-01-0-0.4FT	06		1200		1											X	
IDW-01	07 A-E		1610		5		✓	✓		✓						✓	HOLD
IDW 02	08		1615		5		✓	✓		✓						✓	HOLD
IDW-03		N/A	N/A	S			✓	✓		✓							composite - 07 & - 08 4/26

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Anderson	Floyd Snider	4/26/19	1730
Received by:	Erica Nuno	F&B	4/26/19	1730
Relinquished by:				
Received by:		Samples received at 4 °C		

Friedman & Bruya, Inc.
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FRIEDMAN & BRUYA, INC.

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August 20, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included is the amended report from the testing of material submitted on April 30, 2019 from the Cantera-TOC, F&BI 904600 project.

The 8021B benzene reporting limits were lowered to meet the QAPP requirements.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0517R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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May 17, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on April 30, 2019 from the Cantera-TOC, F&BI 904600 project. There are 27 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0517R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 30, 2019 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera-TOC, F&BI 904600 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
904600 -01	01MW01-043019
904600 -02	01MW06-043019
904600 -03	01MW12-043019
904600 -04	01MW19-043019
904600 -05	01MW24-043019
904600 -06	01MW27-043019
904600 -07	01MW37-043019
904600 -08	01MW38-043019
904600 -09	01MW39-043019
904600 -10	01MW40-043019
904600 -11	01MW42-043019
904600 -12	01MW59-043019
904600 -13	01MW66-043019
904600 -14	01MW420-043019
904600 -15	01MW67-043019
904600 -16	01MW69-043019
904600 -17	01MW74-043019
904600 -18	Trip Blanks

The 8021B benzene reporting limit was reported below the lowest calibration point for several samples. The data were qualified accordingly.

The 8270D surrogate 2-fluorophenol did not pass the acceptance criteria in samples 01MW01-043019, 01MW66-043019, 01MW67-043019, and 01MW69-043019. That surrogate is not associated with pentachlorophenol, therefore the data were acceptable.

All other quality control requirements were acceptable.

Date of Report: 05/17/19
Date Received: 04/30/19
Project: Cantera-TOC, F&BI 904600
Date Extracted: 05/02/19
Date Analyzed: 05/06/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
01MW19-043019 904600-04 1/10	10,000	110
Method Blank 09-828 MB	<100	100

Date of Report: 05/17/19
Date Received: 04/30/19
Project: Cantera-TOC, F&BI 904600
Date Extracted: 05/02/19
Date Analyzed: 05/03/19, 05/04/19, 05/06/19, and 05/07/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
01MW01-043019 904600-01	<0.35 j	<1	<1	<3	<100	79
01MW06-043019 904600-02	0.53	<1	<1	<3	<100	80
01MW12-043019 904600-03	3.0	<1	<1	<3	<100	80
01MW24-043019 904600-05 1/10	1,200	12	64	46	6,100	83
01MW27-043019 904600-06	2.6	<1	<1	<3	<100	79
01MW66-043019 904600-13	<0.35 j	<1	<1	<3	<100	79
01MW74-043019 904600-17	<0.35 j	<1	<1	<3	<100	86
Trip Blanks 904600-18	<0.35 j	<1	<1	<3	<100	84
Method Blank 09-828 MB	<0.35 j	<1	<1	<3	<100	82

Date of Report: 05/17/19
Date Received: 04/30/19
Project: Cantera-TOC, F&BI 904600
Date Extracted: 05/02/19
Date Analyzed: 05/03/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES USING METHOD 8021B

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Surrogate (% Recovery) Limit (52-124)
01MW38-043019 904600-08	0.62	<1	3.3	<3	81
01MW40-043019 904600-10	<0.35 j	<1	<1	<3	80
Method Blank 09-828 MB	<0.35 j	<1	<1	<3	82

Date of Report: 05/17/19
Date Received: 04/30/19
Project: Cantera-TOC, F&BI 904600
Date Extracted: 05/07/19
Date Analyzed: 05/07/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 51-134)
01MW01-043019 904600-01	<50	<250	91
01MW06-043019 904600-02	490 x	<250	106
01MW12-043019 904600-03	590 x	<250	112
01MW19-043019 904600-04	1,900 x	<250	114
01MW24-043019 904600-05	8,700 x	690 x	87
01MW27-043019 904600-06	110 x	<250	91
01MW37-043019 904600-07	600 x	<250	ip
01MW38-043019 904600-08 1/1.2	930 x	<300	104
01MW39-043019 904600-09 1/1.2	1,400 x	<300	128
01MW40-043019 904600-10	1,100 x	<250	112

Date of Report: 05/17/19
Date Received: 04/30/19
Project: Cantera-TOC, F&BI 904600
Date Extracted: 05/07/19
Date Analyzed: 05/07/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 51-134)
01MW42-043019 904600-11	960 x	410 x	121
01MW59-043019 904600-12	860 x	<250	125
01MW66-043019 904600-13	250 x	<250	112
01MW420-043019 904600-14	920 x	390 x	116
01MW67-043019 904600-15	190 x	<250	112
01MW74-043019 904600-17	<50	<250	121
Method Blank 09-1004 MB2	<50	<250	98

Analysis for Semivolatile Phenols By EPA Method 8270D SIM

Client Sample ID:	01MW01-043019	Client:	Floyd-Snider
Date Received:	04/30/19	Project:	Cantera-TOC, F&BI 904600
Date Extracted:	05/07/19	Lab ID:	904600-01
Date Analyzed:	05/09/19	Data File:	050905.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	15 vo	17	97
Phenol-d6	22	10	62
2,4,6-Tribromophenol	96	33	166

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	2.1

Analysis for Semivolatile Phenols By EPA Method 8270D SIM

Client Sample ID:	01MW27-043019	Client:	Floyd-Snider
Date Received:	04/30/19	Project:	Cantera-TOC, F&BI 904600
Date Extracted:	05/07/19	Lab ID:	904600-06
Date Analyzed:	05/09/19	Data File:	050908.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	17	17	97
Phenol-d6	20	10	62
2,4,6-Tribromophenol	91	33	166

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<0.2

Analysis for Semivolatile Phenols By EPA Method 8270D SIM

Client Sample ID:	01MW66-043019	Client:	Floyd-Snider
Date Received:	04/30/19	Project:	Cantera-TOC, F&BI 904600
Date Extracted:	05/07/19	Lab ID:	904600-13
Date Analyzed:	05/09/19	Data File:	050909.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	15 vo	17	97
Phenol-d6	20	10	62
2,4,6-Tribromophenol	102	33	166

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	3.6

Analysis for Semivolatile Phenols By EPA Method 8270D SIM

Client Sample ID:	01MW67-043019	Client:	Floyd-Snider
Date Received:	04/30/19	Project:	Cantera-TOC, F&BI 904600
Date Extracted:	05/07/19	Lab ID:	904600-15
Date Analyzed:	05/09/19	Data File:	050910.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	13 vo	17	97
Phenol-d6	19	10	62
2,4,6-Tribromophenol	103	33	166

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<0.2

Analysis for Semivolatile Phenols By EPA Method 8270D SIM

Client Sample ID:	01MW69-043019	Client:	Floyd-Snider
Date Received:	04/30/19	Project:	Cantera-TOC, F&BI 904600
Date Extracted:	05/07/19	Lab ID:	904600-16
Date Analyzed:	05/09/19	Data File:	050911.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	11 vo	17	97
Phenol-d6	14	10	62
2,4,6-Tribromophenol	108	33	166

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<0.2

Analysis for Semivolatile Phenols By EPA Method 8270D SIM

Client Sample ID:	01MW74-043019	Client:	Floyd-Snider
Date Received:	04/30/19	Project:	Cantera-TOC, F&BI 904600
Date Extracted:	05/07/19	Lab ID:	904600-17
Date Analyzed:	05/09/19	Data File:	050912.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	18	17	97
Phenol-d6	23	10	62
2,4,6-Tribromophenol	94	33	166

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<0.2

Analysis for Semivolatile Phenols By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 904600
Date Extracted:	05/07/19	Lab ID:	09-1048 mb
Date Analyzed:	05/09/19	Data File:	050907.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	18	17	97
Phenol-d6	28	10	62
2,4,6-Tribromophenol	90	33	166

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<0.2

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	01MW19-043019	Client:	Floyd-Snider
Date Received:	04/30/19	Project:	Cantera-TOC, F&BI 904600
Date Extracted:	05/02/19	Lab ID:	904600-04
Date Analyzed:	05/03/19	Data File:	050317.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	91	31	160
Benzo(a)anthracene-d12	92	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	96 ve
Acenaphthylene	<0.02
Acenaphthene	2.0
Fluorene	1.8
Phenanthrene	0.96
Anthracene	0.085
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.02
1-Methylnaphthalene	70 ve
2-Methylnaphthalene	94 ve

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	01MW19-043019	Client:	Floyd-Snider
Date Received:	04/30/19	Project:	Cantera-TOC, F&BI 904600
Date Extracted:	05/02/19	Lab ID:	904600-04 1/100
Date Analyzed:	05/06/19	Data File:	050619.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	70 d	31	160
Benzo(a)anthracene-d12	80 d	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	96
Acenaphthylene	<2
Acenaphthene	2.0
Fluorene	<2
Phenanthrene	<2
Anthracene	<2
Fluoranthene	<2
Pyrene	<2
Benz(a)anthracene	<2
Chrysene	<2
Benzo(a)pyrene	<2
Benzo(b)fluoranthene	<2
Benzo(k)fluoranthene	<2
Indeno(1,2,3-cd)pyrene	<2
Dibenz(a,h)anthracene	<2
Benzo(g,h,i)perylene	<2
1-Methylnaphthalene	67
2-Methylnaphthalene	91

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	01MW69-043019	Client:	Floyd-Snider
Date Received:	04/30/19	Project:	Cantera-TOC, F&BI 904600
Date Extracted:	05/02/19	Lab ID:	904600-16
Date Analyzed:	05/03/19	Data File:	050318.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	88	31	160
Benzo(a)anthracene-d12	90	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	4.2
Acenaphthylene	<0.02
Acenaphthene	0.14
Fluorene	0.40
Phenanthrene	0.079
Anthracene	<0.02
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.02
1-Methylnaphthalene	1.8
2-Methylnaphthalene	0.69

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 904600
Date Extracted:	05/02/19	Lab ID:	09-1008 mb
Date Analyzed:	05/03/19	Data File:	050306.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	92	31	160
Benzo(a)anthracene-d12	94	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.2
Acenaphthylene	<0.02
Acenaphthene	<0.02
Fluorene	<0.02
Phenanthrene	<0.02
Anthracene	<0.02
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.02
1-Methylnaphthalene	<0.2
2-Methylnaphthalene	<0.2

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW19-043019	Client:	Floyd-Snider
Date Received:	04/30/19	Project:	Cantera-TOC, F&BI 904600
Date Extracted:	05/02/19	Lab ID:	904600-04
Date Analyzed:	05/02/19	Data File:	050240.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	57	121
Toluene-d8	104	63	127
4-Bromofluorobenzene	103	60	133

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	480 ve
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	490 ve
Hexane	59	o-Xylene	19
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	41
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	85
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	58
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	210 ve
Benzene	1,100 ve	sec-Butylbenzene	4.2
Trichloroethene	<1	p-Isopropyltoluene	4.8
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	66	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	200 ve
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW19-043019	Client:	Floyd-Snider
Date Received:	04/30/19	Project:	Cantera-TOC, F&BI 904600
Date Extracted:	05/02/19	Lab ID:	904600-04 1/100
Date Analyzed:	05/08/19	Data File:	050834.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<100	1,3-Dichloropropane	<100
Chloromethane	<1,000	Tetrachloroethene	<100
Vinyl chloride	<20	Dibromochloromethane	<100
Bromomethane	<100	1,2-Dibromoethane (EDB)	<100
Chloroethane	<100	Chlorobenzene	<100
Trichlorofluoromethane	<100	Ethylbenzene	570
Acetone	<5,000	1,1,1,2-Tetrachloroethane	<100
1,1-Dichloroethene	<100	m,p-Xylene	490
Hexane	<100	o-Xylene	<100
Methylene chloride	<500	Styrene	<100
Methyl t-butyl ether (MTBE)	<100	Isopropylbenzene	<100
trans-1,2-Dichloroethene	<100	Bromoform	<100
1,1-Dichloroethane	<100	n-Propylbenzene	<100
2,2-Dichloropropane	<100	Bromobenzene	<100
cis-1,2-Dichloroethene	<100	1,3,5-Trimethylbenzene	<100
Chloroform	<100	1,1,2,2-Tetrachloroethane	<100
2-Butanone (MEK)	<1,000	1,2,3-Trichloropropane	<100
1,2-Dichloroethane (EDC)	<100	2-Chlorotoluene	<100
1,1,1-Trichloroethane	<100	4-Chlorotoluene	<100
1,1-Dichloropropene	<100	tert-Butylbenzene	<100
Carbon tetrachloride	<100	1,2,4-Trimethylbenzene	180
Benzene	2,600	sec-Butylbenzene	<100
Trichloroethene	<100	p-Isopropyltoluene	<100
1,2-Dichloropropane	<100	1,3-Dichlorobenzene	<100
Bromodichloromethane	<100	1,4-Dichlorobenzene	<100
Dibromomethane	<100	1,2-Dichlorobenzene	<100
4-Methyl-2-pentanone	<1,000	1,2-Dibromo-3-chloropropane	<1,000
cis-1,3-Dichloropropene	<100	1,2,4-Trichlorobenzene	<100
Toluene	<100	Hexachlorobutadiene	<100
trans-1,3-Dichloropropene	<100	Naphthalene	160
1,1,2-Trichloroethane	<100	1,2,3-Trichlorobenzene	<100
2-Hexanone	<1,000		

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW69-043019	Client:	Floyd-Snider
Date Received:	04/30/19	Project:	Cantera-TOC, F&BI 904600
Date Extracted:	05/02/19	Lab ID:	904600-16
Date Analyzed:	05/13/19	Data File:	051313.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	90	50	150

Compounds:	Concentration ug/L (ppb)
Hexane	<1
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1
1,2-Dibromoethane (EDB)	<1
Benzene	0.74
Toluene	<1
Ethylbenzene	9.5
m,p-Xylene	11
o-Xylene	1.9
Naphthalene	6.4

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 904600
Date Extracted:	05/02/19	Lab ID:	09-930 mb
Date Analyzed:	05/02/19	Data File:	050207.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	97	63	127
4-Bromofluorobenzene	96	60	133

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<1	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Date of Report: 05/17/19
Date Received: 04/30/19
Project: Cantera-TOC, F&BI 904600

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING METHOD 8021B AND NWTPH-Gx

Laboratory Code: 904570-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	95	65-118
Toluene	ug/L (ppb)	50	93	72-122
Ethylbenzene	ug/L (ppb)	50	87	73-126
Xylenes	ug/L (ppb)	150	91	74-118
Gasoline	ug/L (ppb)	1,000	110	69-134

Date of Report: 05/17/19
Date Received: 04/30/19
Project: Cantera-TOC, F&BI 904600

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	102	105	58-134	3

Date of Report: 05/17/19
Date Received: 04/30/19
Project: Cantera-TOC, F&BI 904600

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR SEMIVOLATILE PHENOLS BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 30)
Pentachlorophenol	ug/L (ppb)	2.5	71	88	23-185	21

Date of Report: 05/17/19
Date Received: 04/30/19
Project: Cantera-TOC, F&BI 904600

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	1	71	73	67-116	3
2-Methylnaphthalene	ug/L (ppb)	1	74	74	63-122	0
1-Methylnaphthalene	ug/L (ppb)	1	74	74	65-122	0
Acenaphthylene	ug/L (ppb)	1	74	75	65-119	1
Acenaphthene	ug/L (ppb)	1	77	77	66-118	0
Fluorene	ug/L (ppb)	1	78	79	64-125	1
Phenanthrene	ug/L (ppb)	1	80	80	67-120	0
Anthracene	ug/L (ppb)	1	81	80	65-122	1
Fluoranthene	ug/L (ppb)	1	80	79	65-127	1
Pyrene	ug/L (ppb)	1	72	67	62-130	7
Benz(a)anthracene	ug/L (ppb)	1	83	82	60-118	1
Chrysene	ug/L (ppb)	1	86	83	66-125	4
Benzo(b)fluoranthene	ug/L (ppb)	1	82	76	55-135	8
Benzo(k)fluoranthene	ug/L (ppb)	1	78	79	62-125	1
Benzo(a)pyrene	ug/L (ppb)	1	74	72	58-127	3
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	67	66	36-142	2
Dibenz(a,h)anthracene	ug/L (ppb)	1	61	60	37-133	2
Benzo(g,h,i)perylene	ug/L (ppb)	1	66	66	34-135	0

Date of Report: 05/17/19
Date Received: 04/30/19
Project: Cantera-TOC, F&BI 904600

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	ug/L (ppb)	50	107	122	25-158	13
Chloromethane	ug/L (ppb)	50	111	117	45-156	5
Vinyl chloride	ug/L (ppb)	50	115	118	50-154	3
Bromomethane	ug/L (ppb)	50	93	95	55-143	2
Chloroethane	ug/L (ppb)	50	92	96	58-146	4
Trichlorofluoromethane	ug/L (ppb)	250	102	105	50-150	3
Acetone	ug/L (ppb)	250	107	94	53-131	13
1,1-Dichloroethene	ug/L (ppb)	50	131	132	67-136	1
Hexane	ug/L (ppb)	50	88	96	57-137	9
Methylene chloride	ug/L (ppb)	50	119	117	39-148	2
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	105	94	64-147	11
trans-1,2-Dichloroethene	ug/L (ppb)	50	123	124	68-128	1
1,1-Dichloroethane	ug/L (ppb)	50	112	115	79-121	3
2,2-Dichloropropane	ug/L (ppb)	50	107	106	55-143	1
cis-1,2-Dichloroethene	ug/L (ppb)	50	105	106	80-123	1
Chloroform	ug/L (ppb)	50	98	100	80-121	2
2-Butanone (MEK)	ug/L (ppb)	250	103	102	57-149	1
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	94	100	73-132	6
1,1,1-Trichloroethane	ug/L (ppb)	50	111	112	83-130	1
1,1-Dichloropropene	ug/L (ppb)	50	100	108	77-129	8
Carbon tetrachloride	ug/L (ppb)	50	113	114	75-158	1
Benzene	ug/L (ppb)	50	97	104	69-134	7
Trichloroethene	ug/L (ppb)	50	96	103	80-120	7
1,2-Dichloropropane	ug/L (ppb)	50	96	103	77-123	7
Bromodichloromethane	ug/L (ppb)	50	102	109	81-133	7
Dibromomethane	ug/L (ppb)	50	101	107	82-125	6
4-Methyl-2-pentanone	ug/L (ppb)	250	113	108	65-138	5
cis-1,3-Dichloropropene	ug/L (ppb)	50	92	105	82-132	13
Toluene	ug/L (ppb)	50	91	98	72-122	7
trans-1,3-Dichloropropene	ug/L (ppb)	50	93	104	80-136	11
1,1,2-Trichloroethane	ug/L (ppb)	50	103	108	75-124	5
2-Hexanone	ug/L (ppb)	250	107	108	60-136	1
1,3-Dichloropropane	ug/L (ppb)	50	98	105	76-126	7
Tetrachloroethene	ug/L (ppb)	50	92	98	76-121	6
Dibromochloromethane	ug/L (ppb)	50	107	110	84-133	3
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	102	109	82-125	7
Chlorobenzene	ug/L (ppb)	50	93	100	83-114	7
Ethylbenzene	ug/L (ppb)	50	96	101	77-124	5
1,1,1,2-Tetrachloroethane	ug/L (ppb)	50	113	110	84-127	3
m,p-Xylene	ug/L (ppb)	100	96	101	83-125	5
o-Xylene	ug/L (ppb)	50	93	94	81-121	1
Styrene	ug/L (ppb)	50	96	103	84-119	7
Isopropylbenzene	ug/L (ppb)	50	99	101	85-117	2
Bromoform	ug/L (ppb)	50	109	101	74-136	8
n-Propylbenzene	ug/L (ppb)	50	95	106	74-126	11
Bromobenzene	ug/L (ppb)	50	99	109	80-121	10
1,3,5-Trimethylbenzene	ug/L (ppb)	50	96	102	78-123	6
1,1,2,2-Tetrachloroethane	ug/L (ppb)	50	115	112	66-126	3
1,2,3-Trichloropropane	ug/L (ppb)	50	106	103	67-124	3
2-Chlorotoluene	ug/L (ppb)	50	95	103	77-127	8
4-Chlorotoluene	ug/L (ppb)	50	95	105	78-128	10
tert-Butylbenzene	ug/L (ppb)	50	96	102	80-123	6
1,2,4-Trimethylbenzene	ug/L (ppb)	50	96	101	79-122	5
sec-Butylbenzene	ug/L (ppb)	50	98	103	80-125	5
p-Isopropyltoluene	ug/L (ppb)	50	97	102	81-123	5
1,3-Dichlorobenzene	ug/L (ppb)	50	102	108	85-116	6
1,4-Dichlorobenzene	ug/L (ppb)	50	96	103	84-121	7
1,2-Dichlorobenzene	ug/L (ppb)	50	102	103	85-116	1
1,2-Dibromo-3-chloropropane	ug/L (ppb)	50	131	114	57-141	14
1,2,4-Trichlorobenzene	ug/L (ppb)	50	124	117	72-130	6
Hexachlorobutadiene	ug/L (ppb)	50	117	108	53-141	8
Naphthalene	ug/L (ppb)	50	130	114	64-133	13
1,2,3-Trichlorobenzene	ug/L (ppb)	50	125	111	65-136	12

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

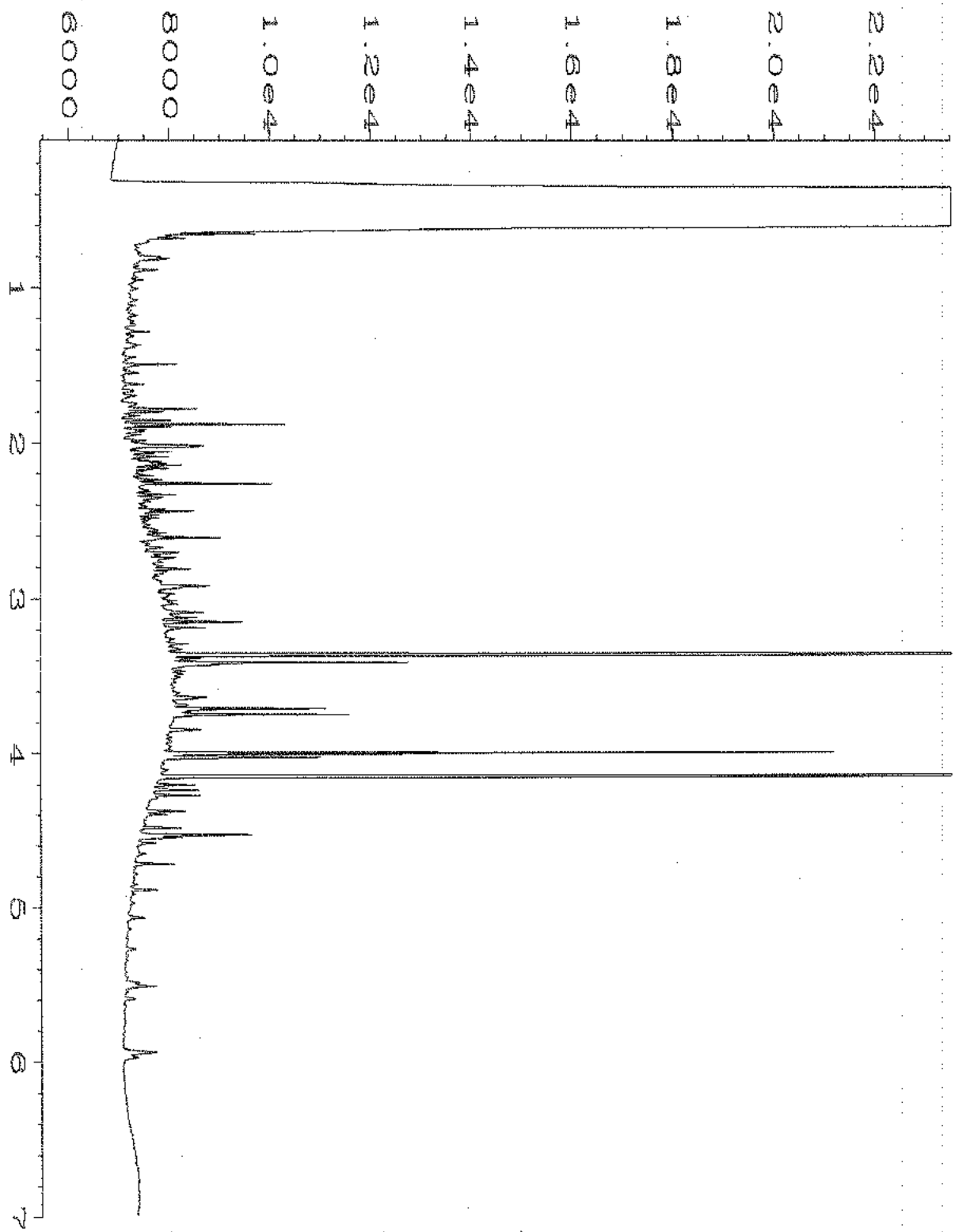
nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.



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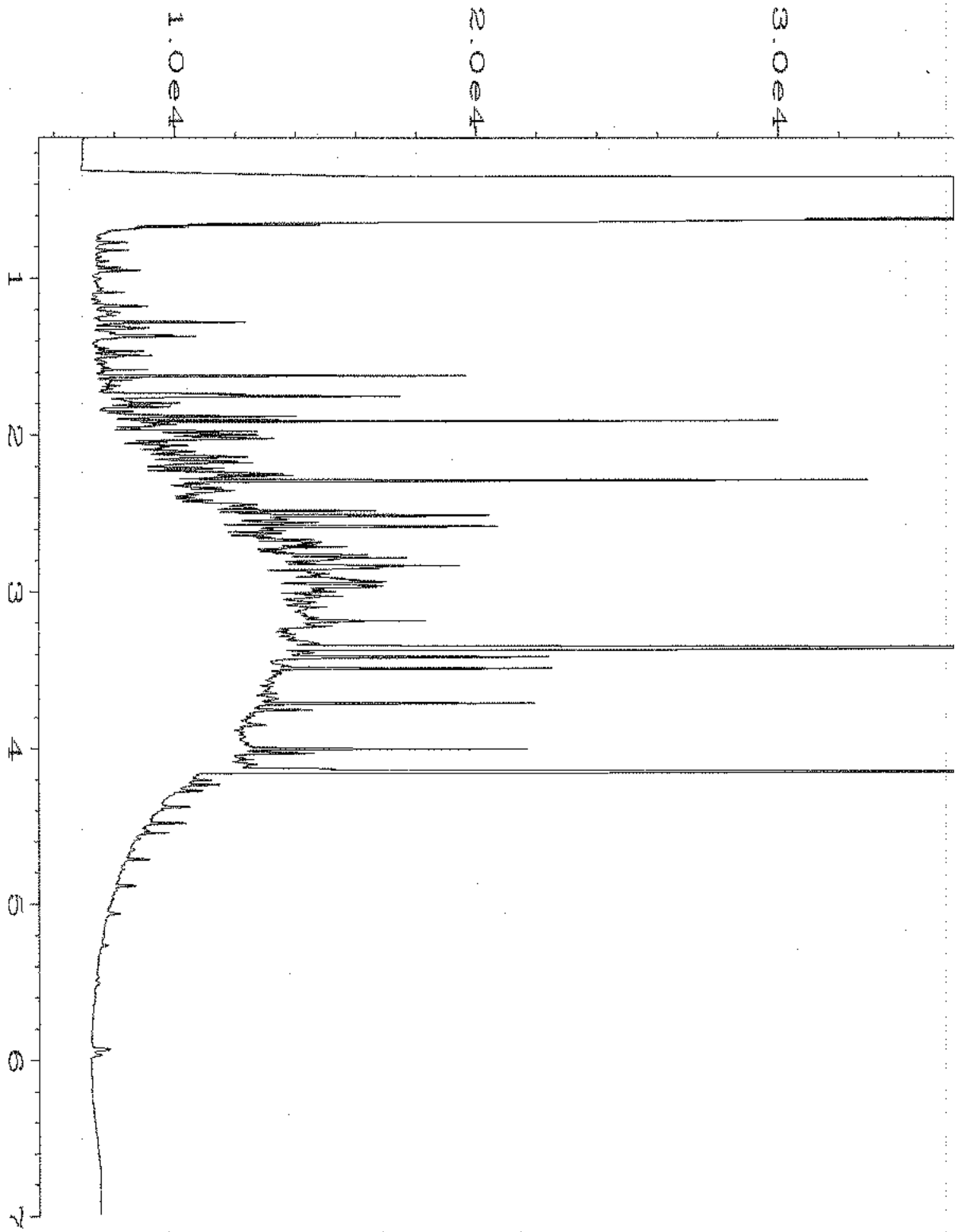
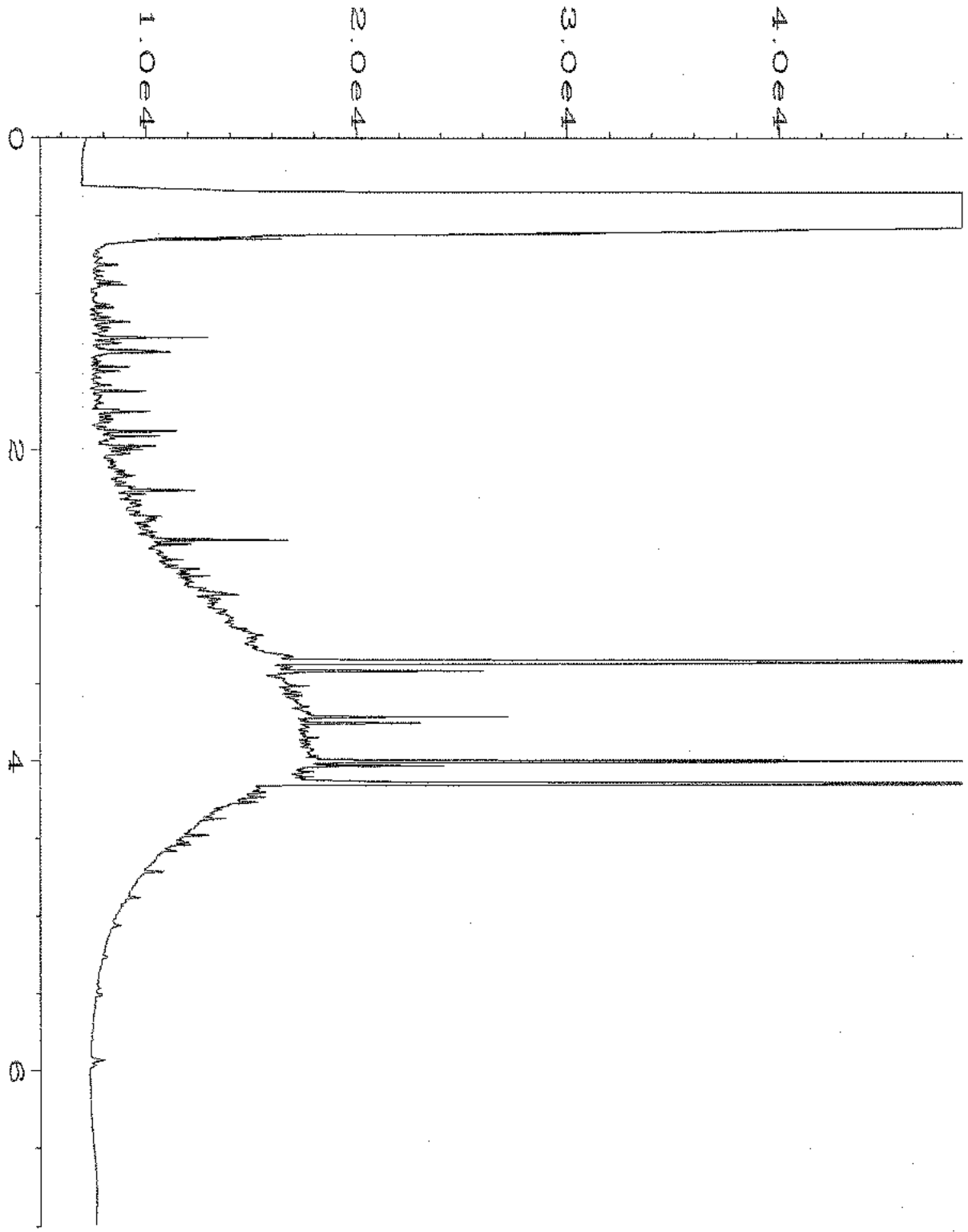
Operator : TL
Instrument : GC6
Sample Name : 904600-01
Run Time Bar Code:
Acquired on : 07 May 19 04:18 PM
Report Created on: 08 May 19 11:13 AM

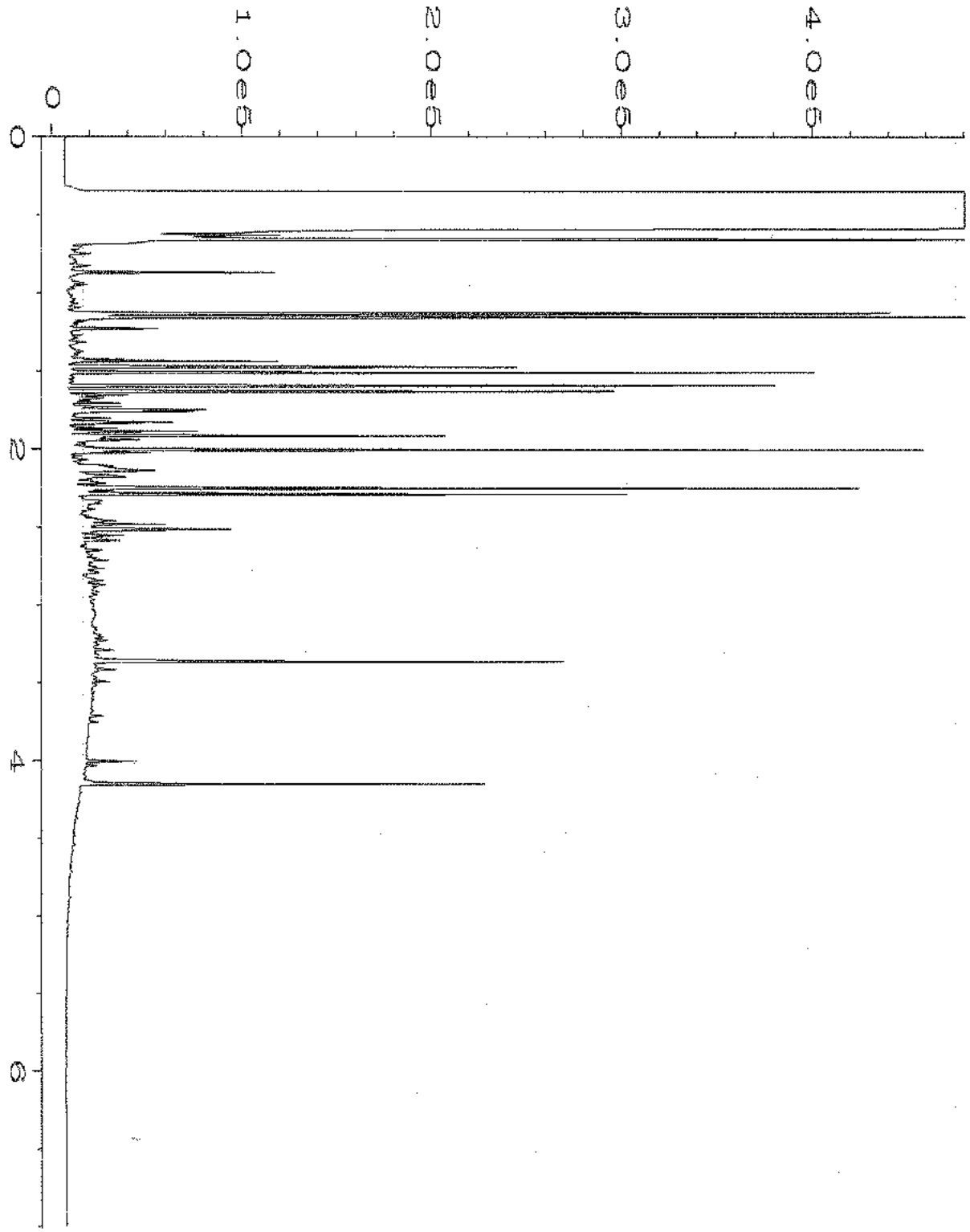
Page Number : 1
Vial Number : 18
Injection Number : 1
Sequence Line : 5
Instrument Method: DX.MTH
Analysis Method : DX.MTH



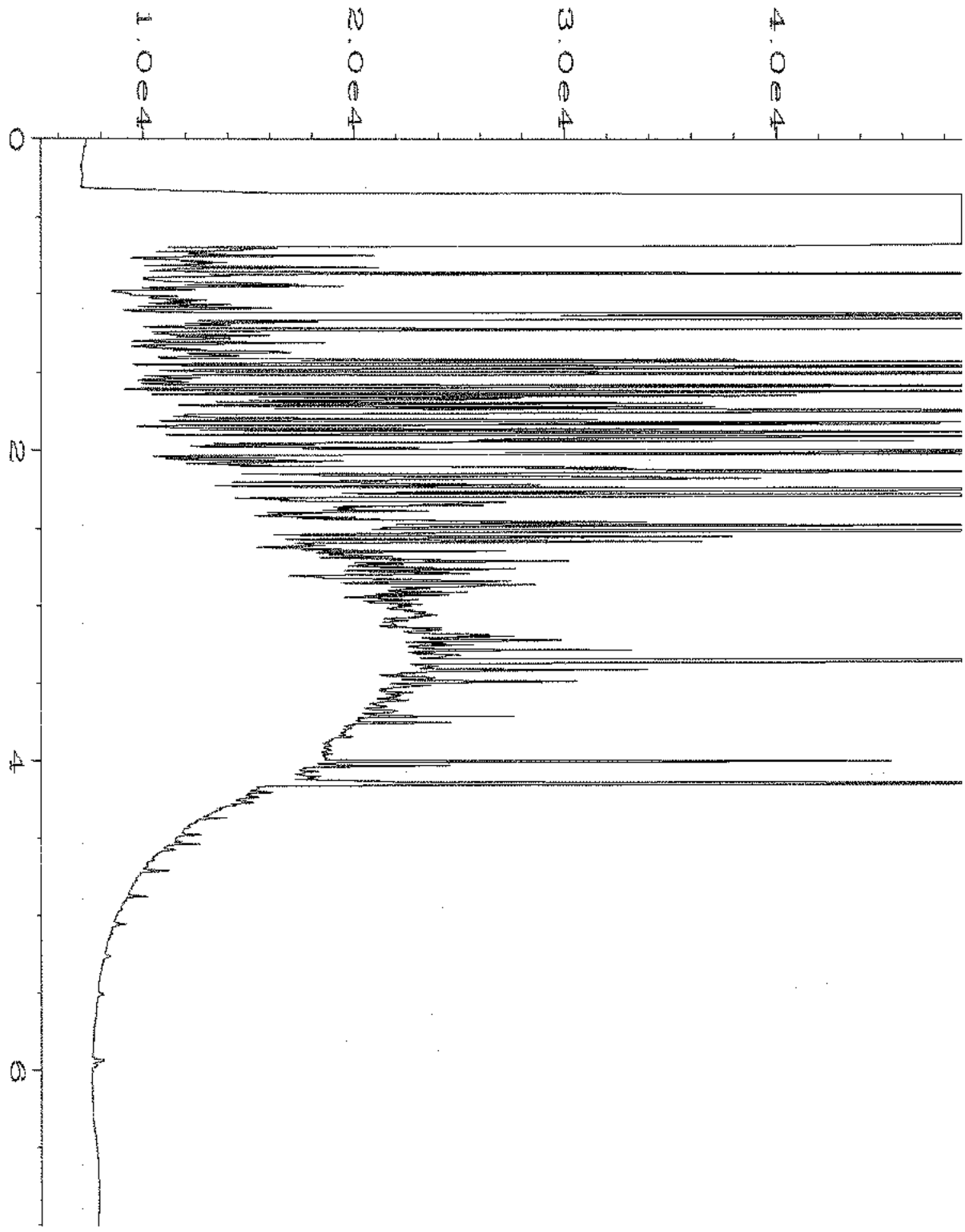
Data File Name	: C:\HPCHEM\6\DATA\05-07-19\019F0501.D		
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 19
Sample Name	: 904600-02	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 07 May 19 04:29 PM	Instrument Method	: DX.MTH
Report Created on	: 08 May 19 11:13 AM	Analysis Method	: DX.MTH



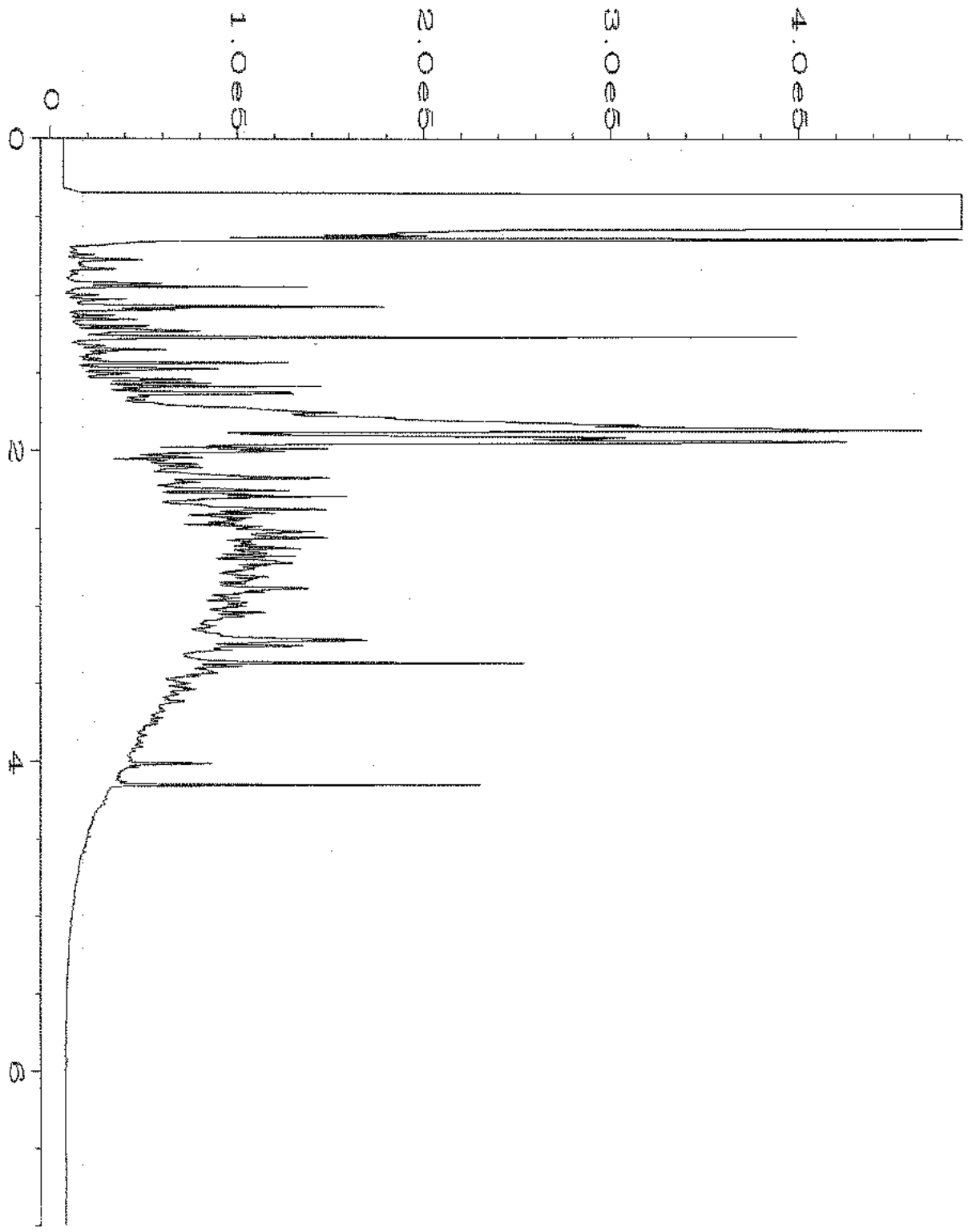
Data File Name	: C:\HPCHEM\6\DATA\05-07-19\020F0501.D		
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 20
Sample Name	: 904600-03	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 07 May 19 04:40 PM	Instrument Method	: DX.MTH
Report Created on	: 08 May 19 11:13 AM	Analysis Method	: DX.MTH



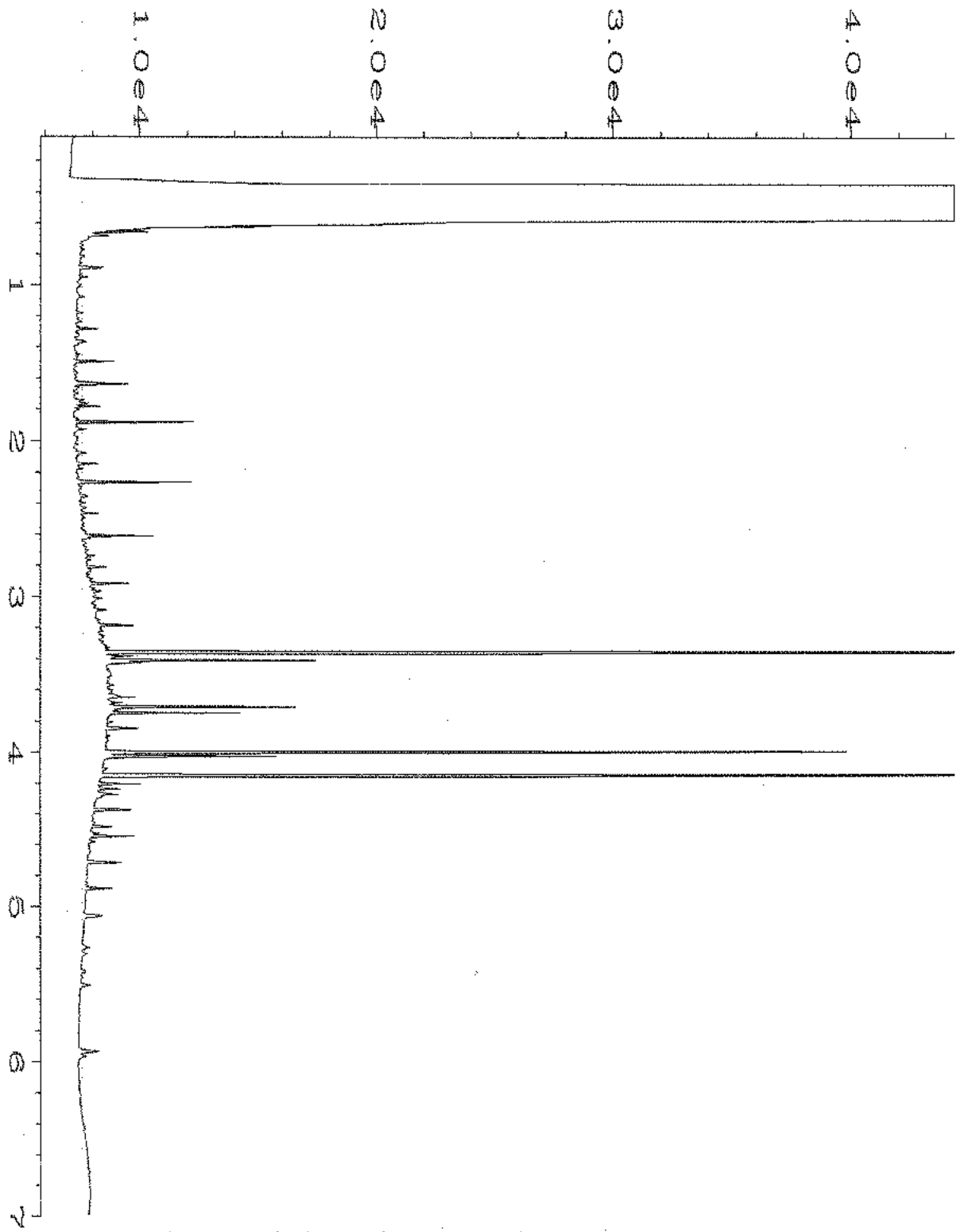
Data File Name	: C:\HPCHEM\6\DATA\05-07-19\021F0501.D		
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 21
Sample Name	: 904600-04	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 07 May 19 04:51 PM	Instrument Method	: DX.MTH
Report Created on	: 08 May 19 11:14 AM	Analysis Method	: DX.MTH



Data File Name	: C:\HPCHEM\6\DATA\05-07-19\021F0501.D		
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 21
Sample Name	: 904600-04	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 07 May 19 04:51 PM	Instrument Method	: DX.MTH
Report Created on	: 08 May 19 11:13 AM	Analysis Method	: DX.MTH

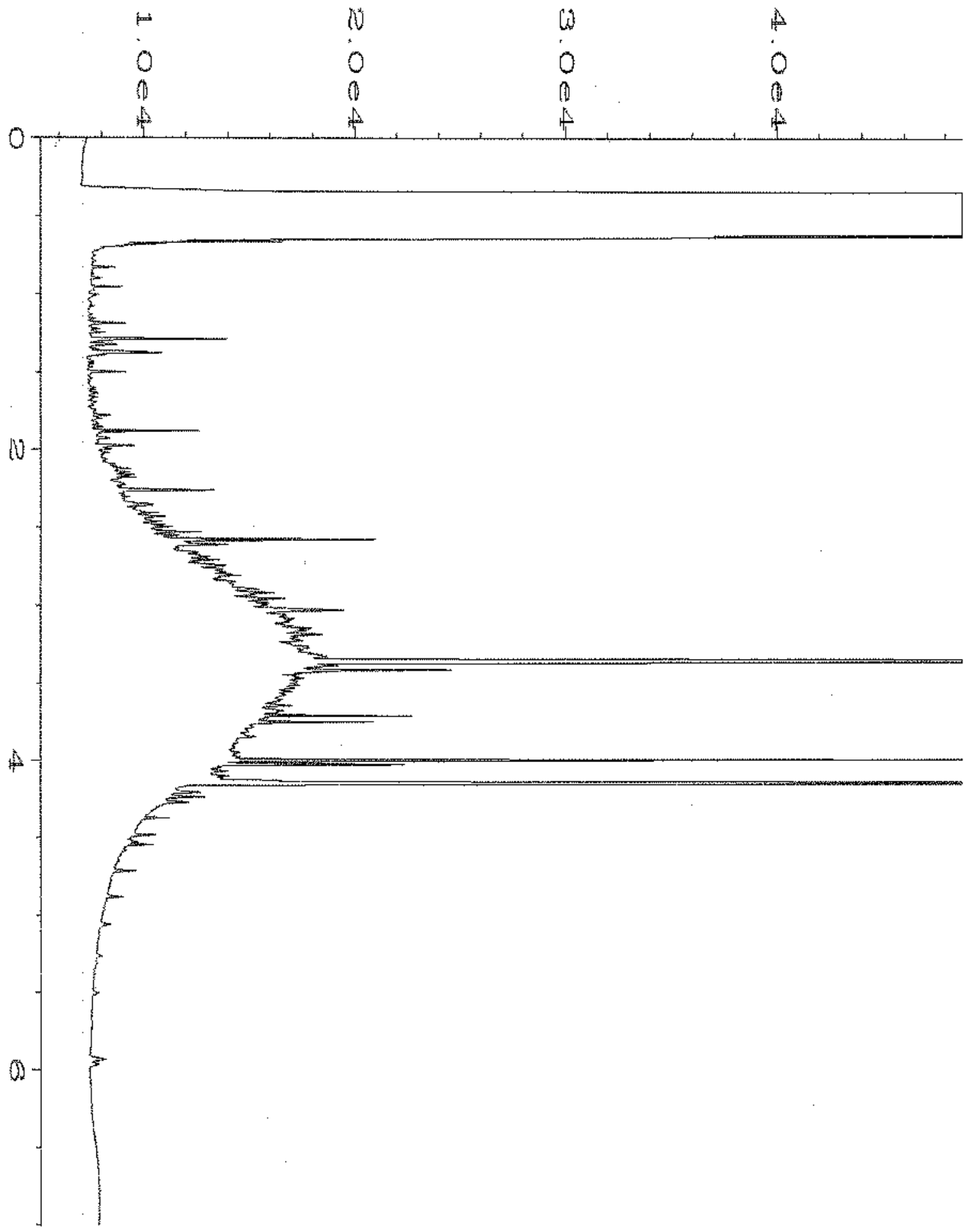


Data File Name	: C:\HPCHEM\6\DATA\05-07-19\022F0501.D		
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 22
Sample Name	: 904600-05	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 07 May 19 05:02 PM	Instrument Method	: DX.MTH
Report Created on:	08 May 19 11:14 AM	Analysis Method	: DX.MTH

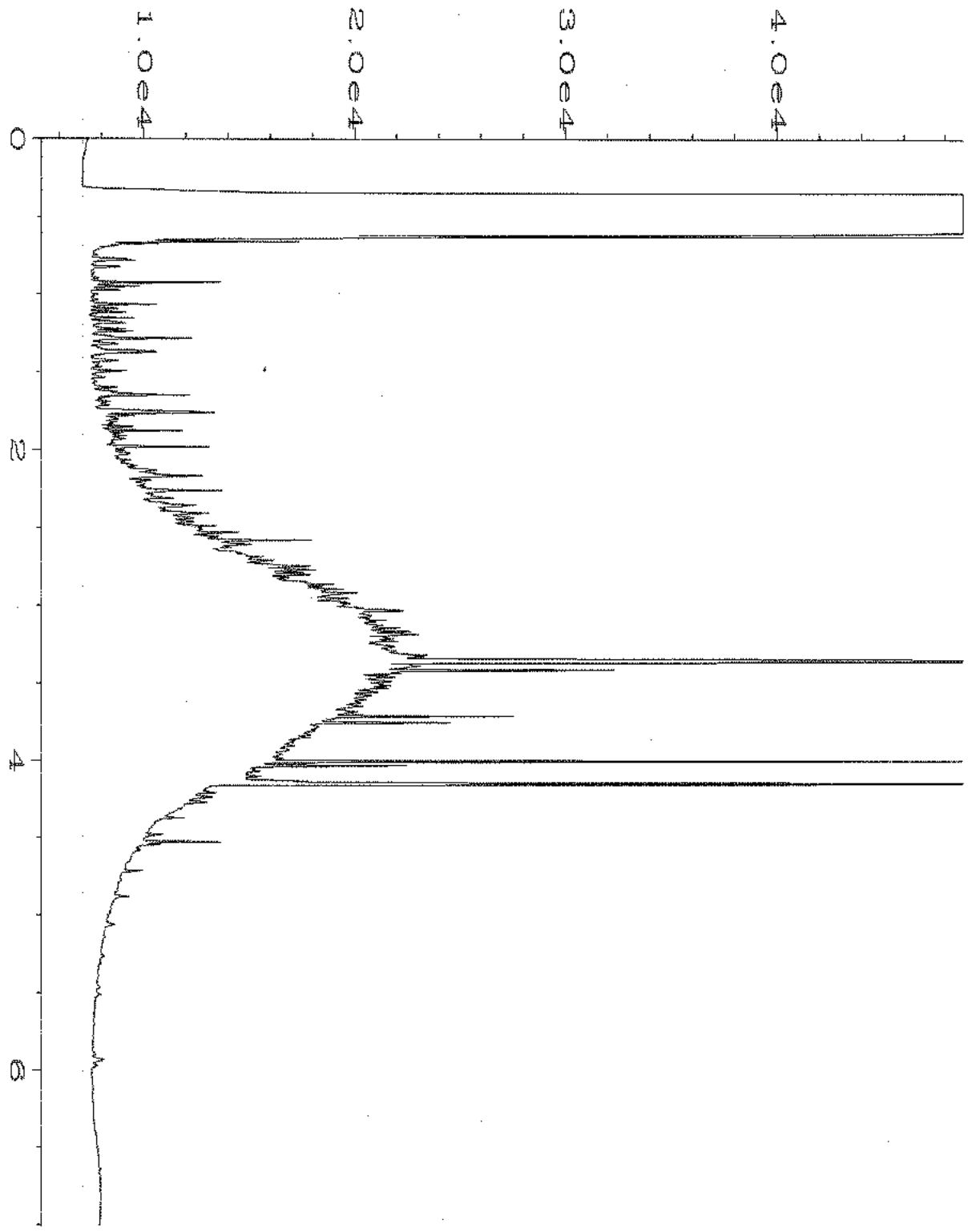


Data File Name : C:\HPCHEM\6\DATA\05-07-19\023F0501.D
Operator : TL
Instrument : GC6
Sample Name : 904600-06
Run Time Bar Code:
Acquired on : 07 May 19 05:13 PM
Report Created on: 08 May 19 11:15 AM

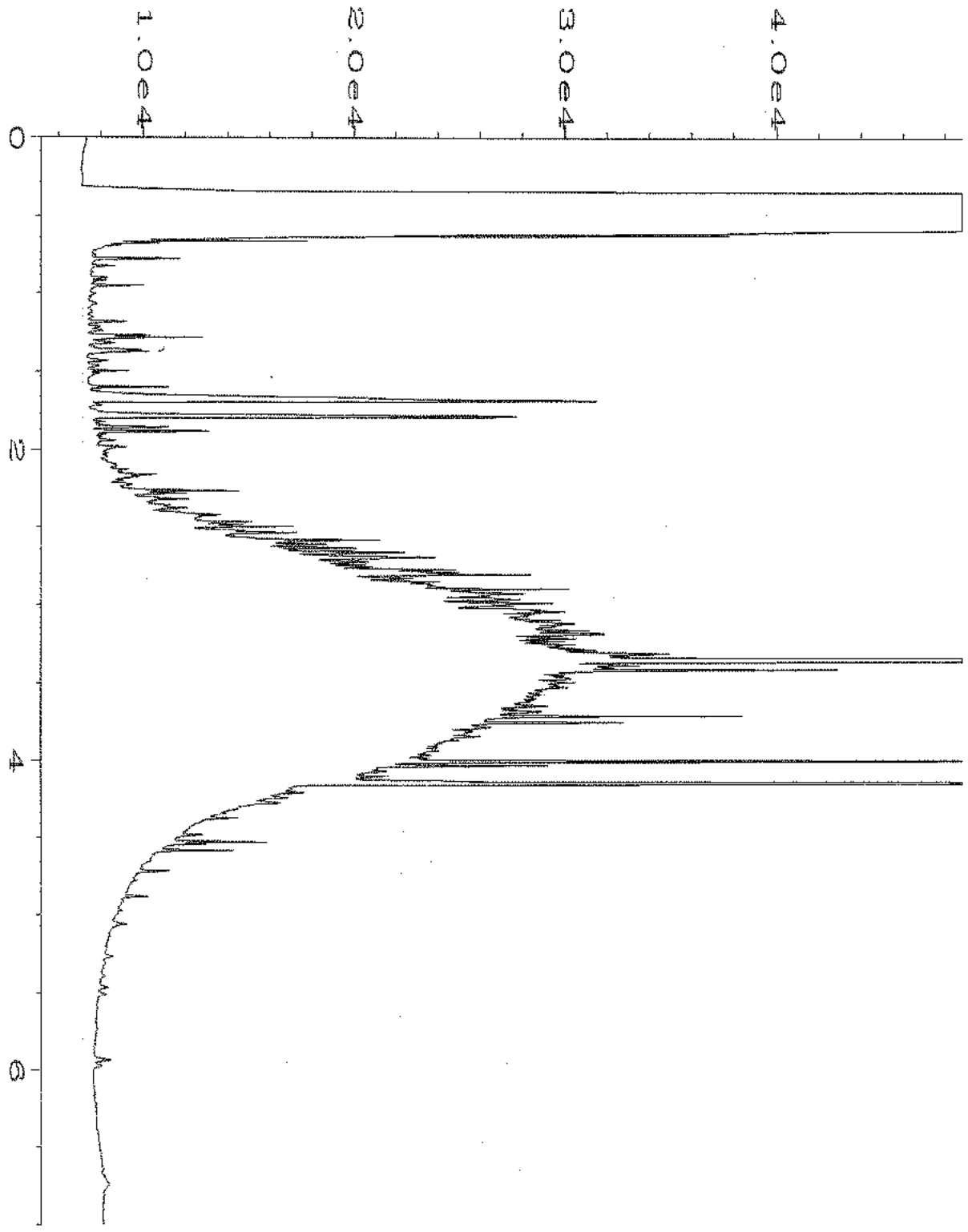
Page Number : 1
Vial Number : 23
Injection Number : 1
Sequence Line : 5
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name	: C:\HPCHEM\6\DATA\05-07-19\024F0501.D		
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 24
Sample Name	: 904600-07	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 07 May 19 05:25 PM	Instrument Method	: DX.MTH
Report Created on	: 08 May 19 11:15 AM	Analysis Method	: DX.MTH

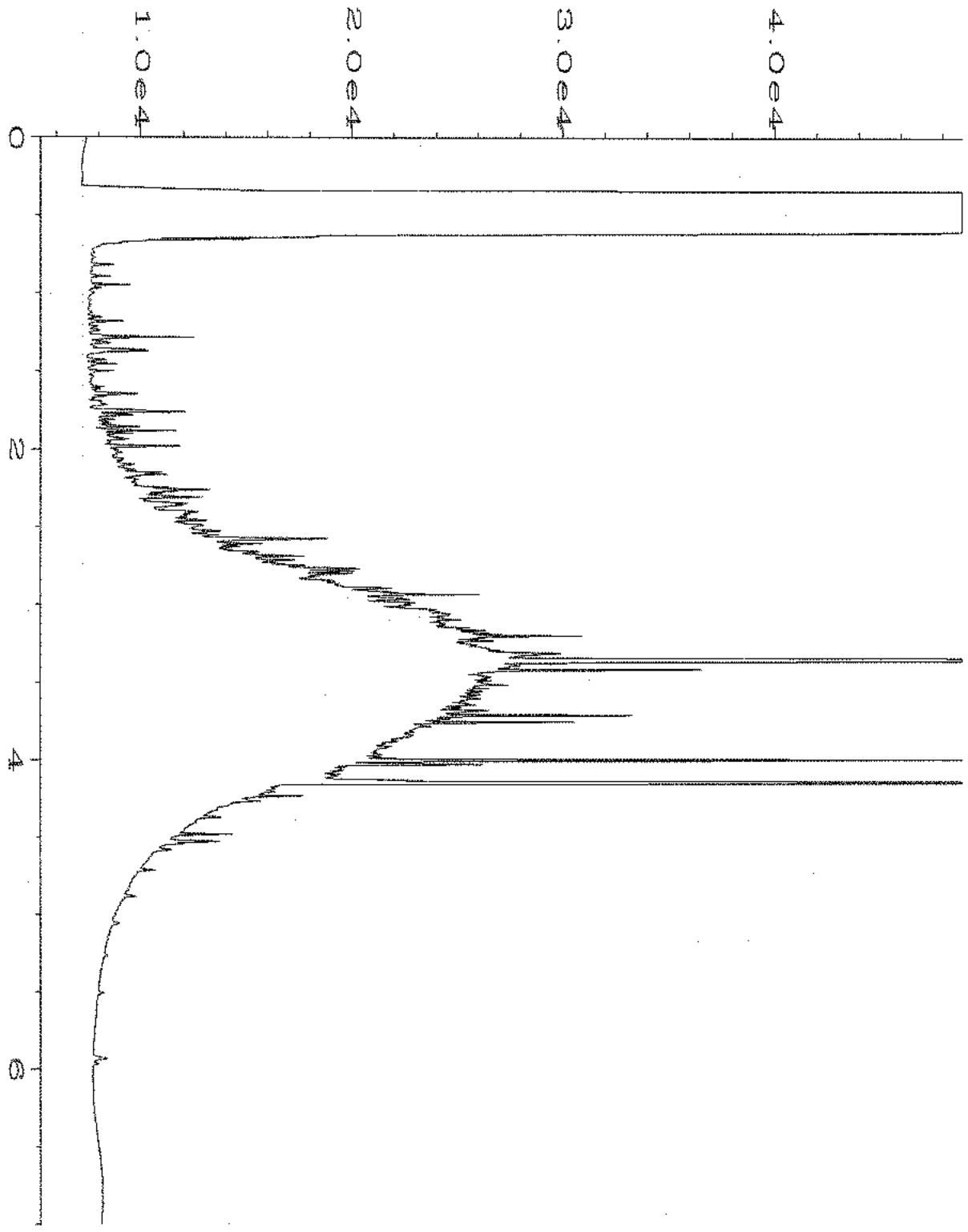


Data File Name	: C:\HPCHEM\6\DATA\05-07-19\025F0501.D		
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 25
Sample Name	: 904600-08	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 07 May 19 05:36 PM	Instrument Method	: DX.MTH
Report Created on	: 08 May 19 11:16 AM	Analysis Method	: DX.MTH

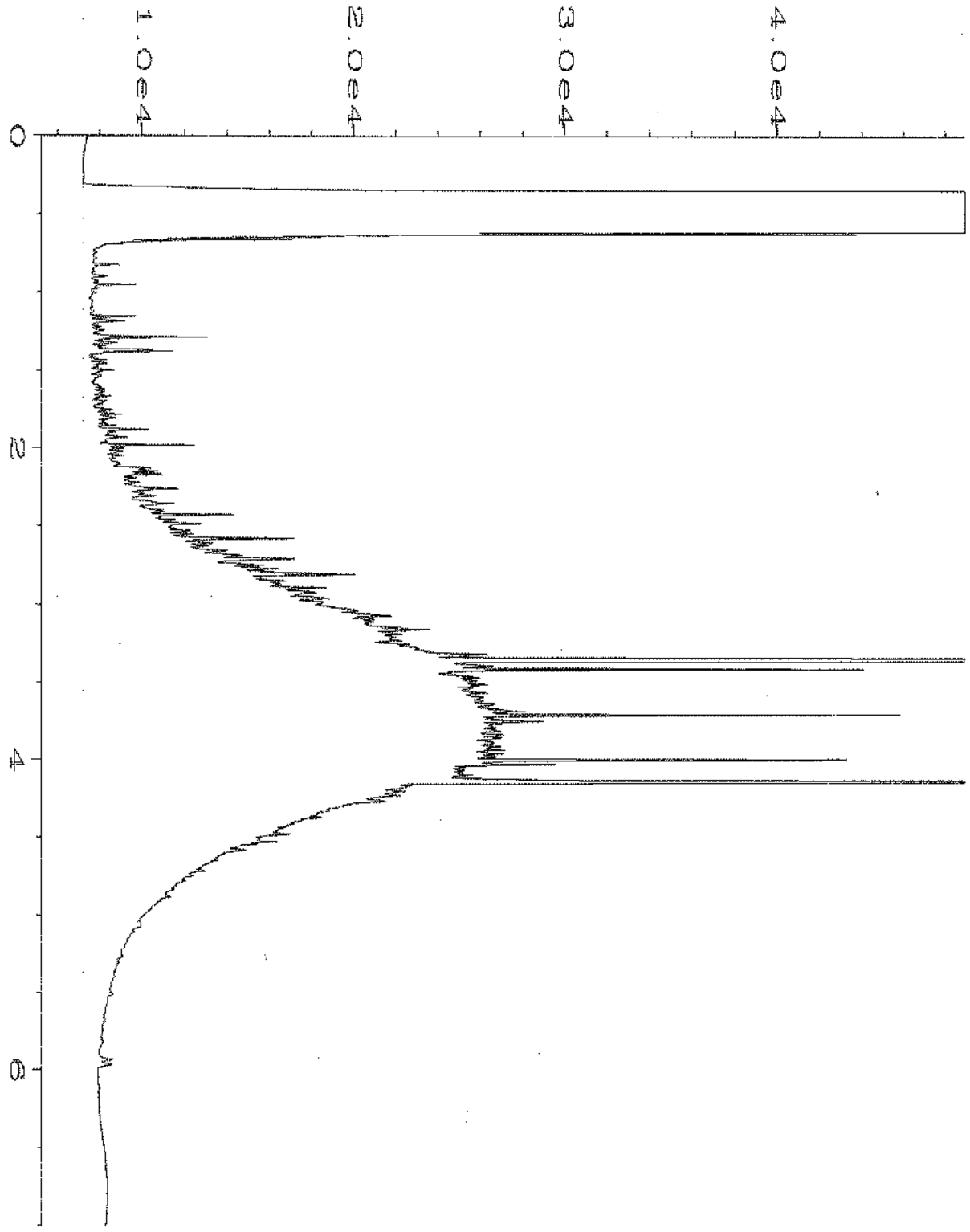


Data File Name : C:\HPCHEM\6\DATA\05-07-19\026F0501.D
Operator : TL
Instrument : GC6
Sample Name : 904600-09
Run Time Bar Code:
Acquired on : 07 May 19 05:47 PM
Report Created on: 08 May 19 11:16 AM

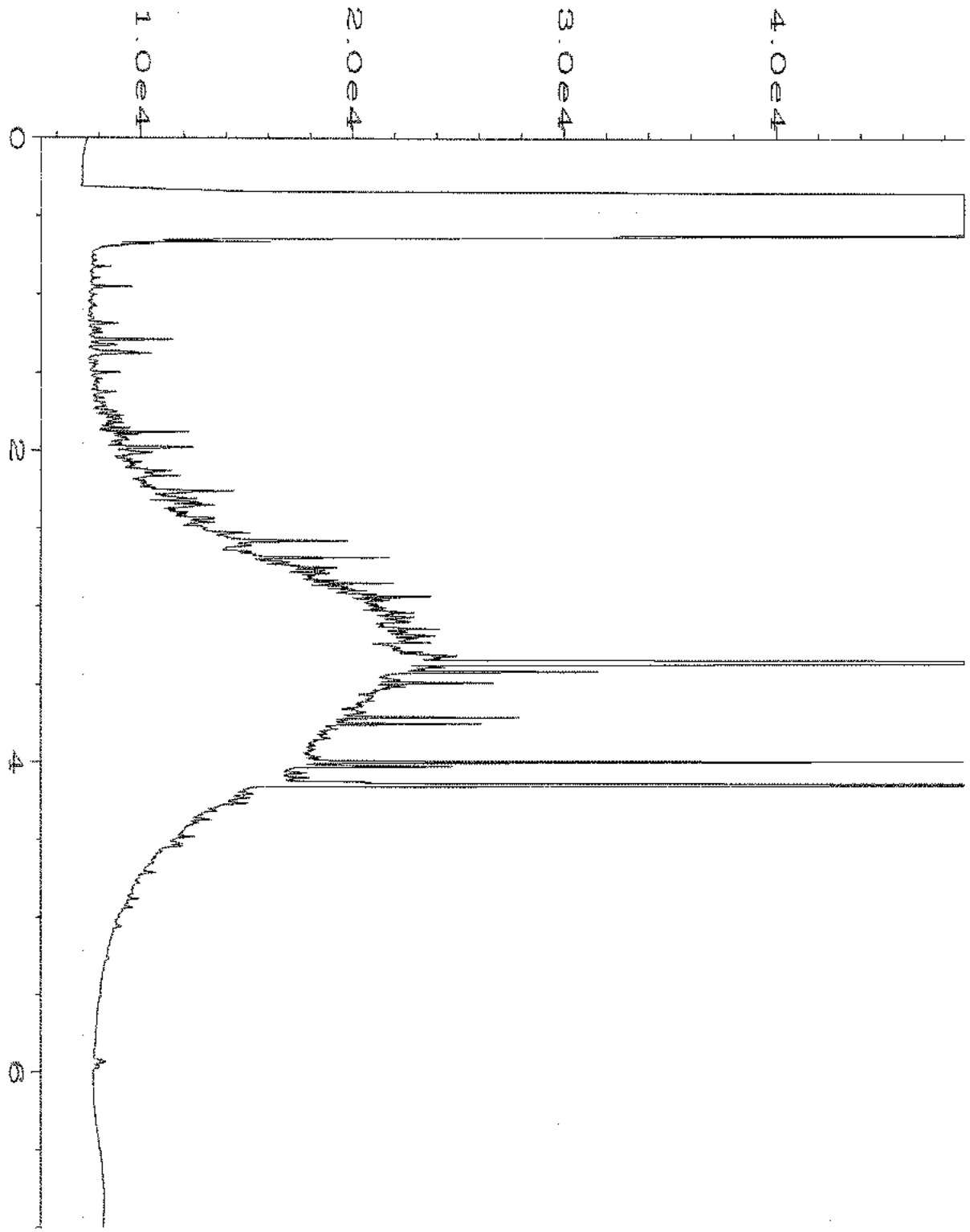
Page Number : 1
Vial Number : 26
Injection Number : 1
Sequence Line : 5
Instrument Method: DX.MTH
Analysis Method : DX.MTH



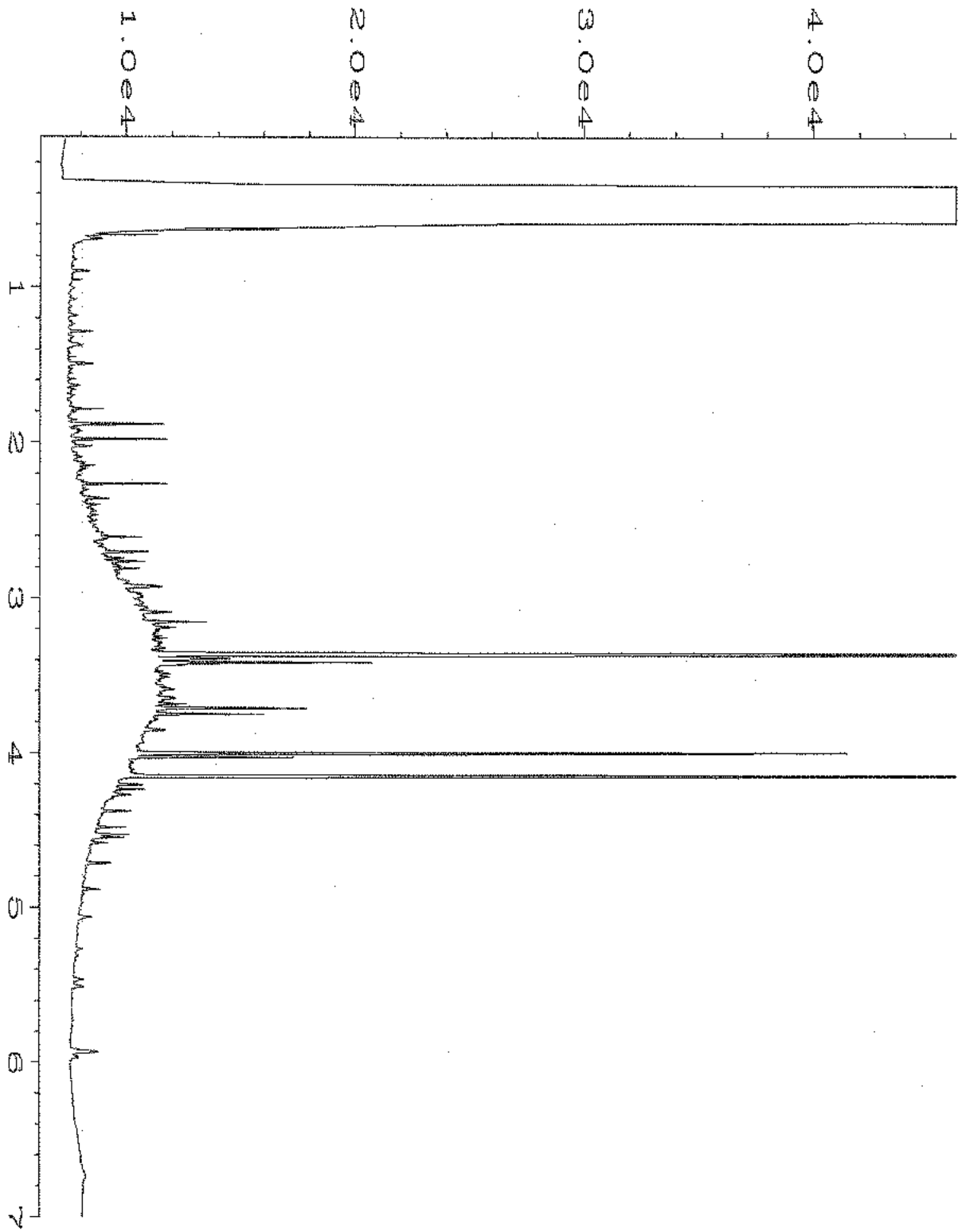
Data File Name	: C:\HPCHEM\6\DATA\05-07-19\027F0501.D		
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 27
Sample Name	: 904600-10	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 07 May 19 05:58 PM	Instrument Method	: DX.MTH
Report Created on	: 08 May 19 11:16 AM	Analysis Method	: DX.MTH



Data File Name	: C:\HPCHEM\6\DATA\05-07-19\028F0501.D		
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 28
Sample Name	: 904600-11	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 07 May 19 06:09 PM	Instrument Method	: DX.MTH
Report Created on	: 08 May 19 11:16 AM	Analysis Method	: DX.MTH

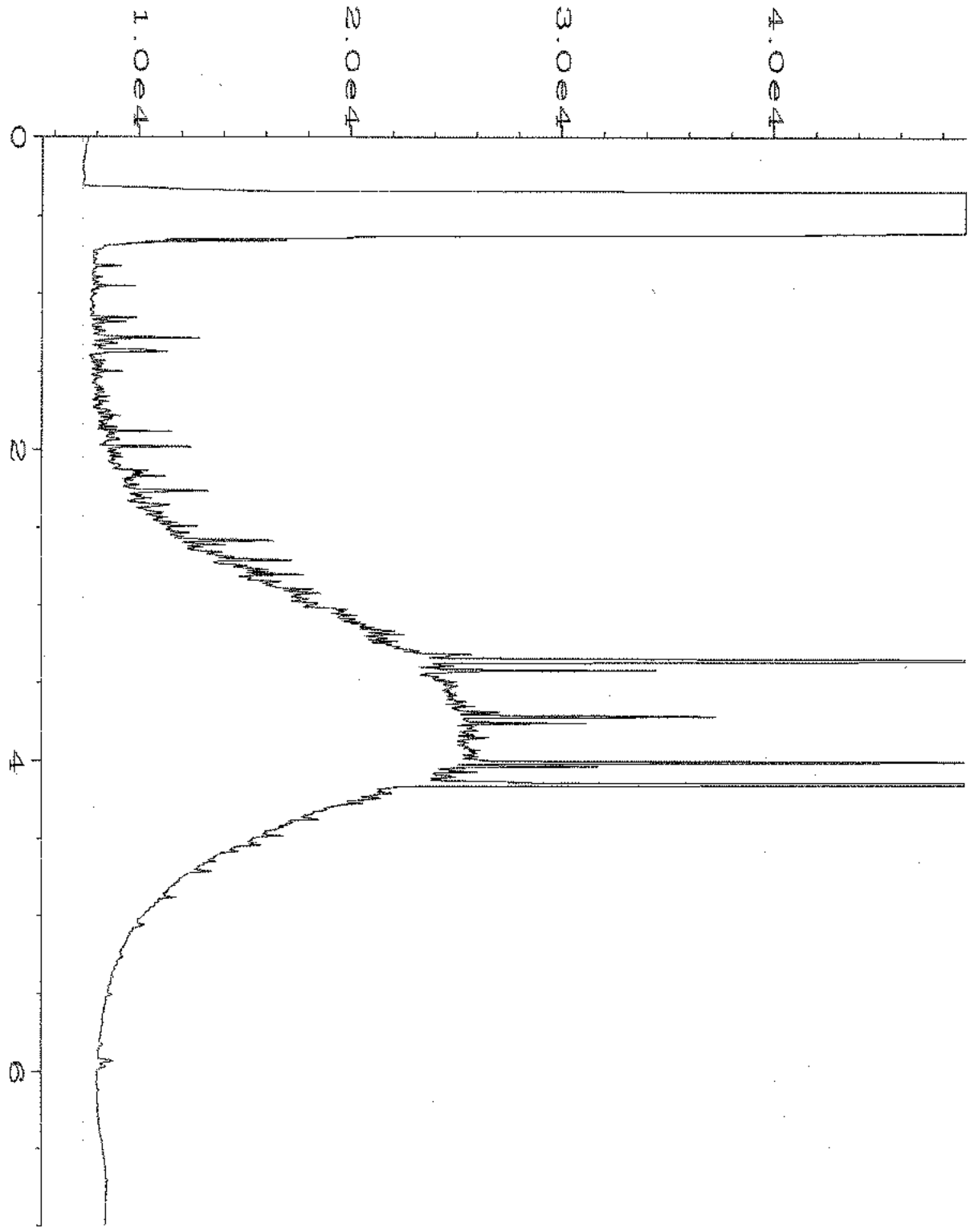


Data File Name	: C:\HPCHEM\6\DATA\05-07-19\029F0501.D		
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 29
Sample Name	: 904600-12	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 07 May 19 06:20 PM	Instrument Method	: DX.MTH
Report Created on	: 08 May 19 11:16 AM	Analysis Method	: DX.MTH

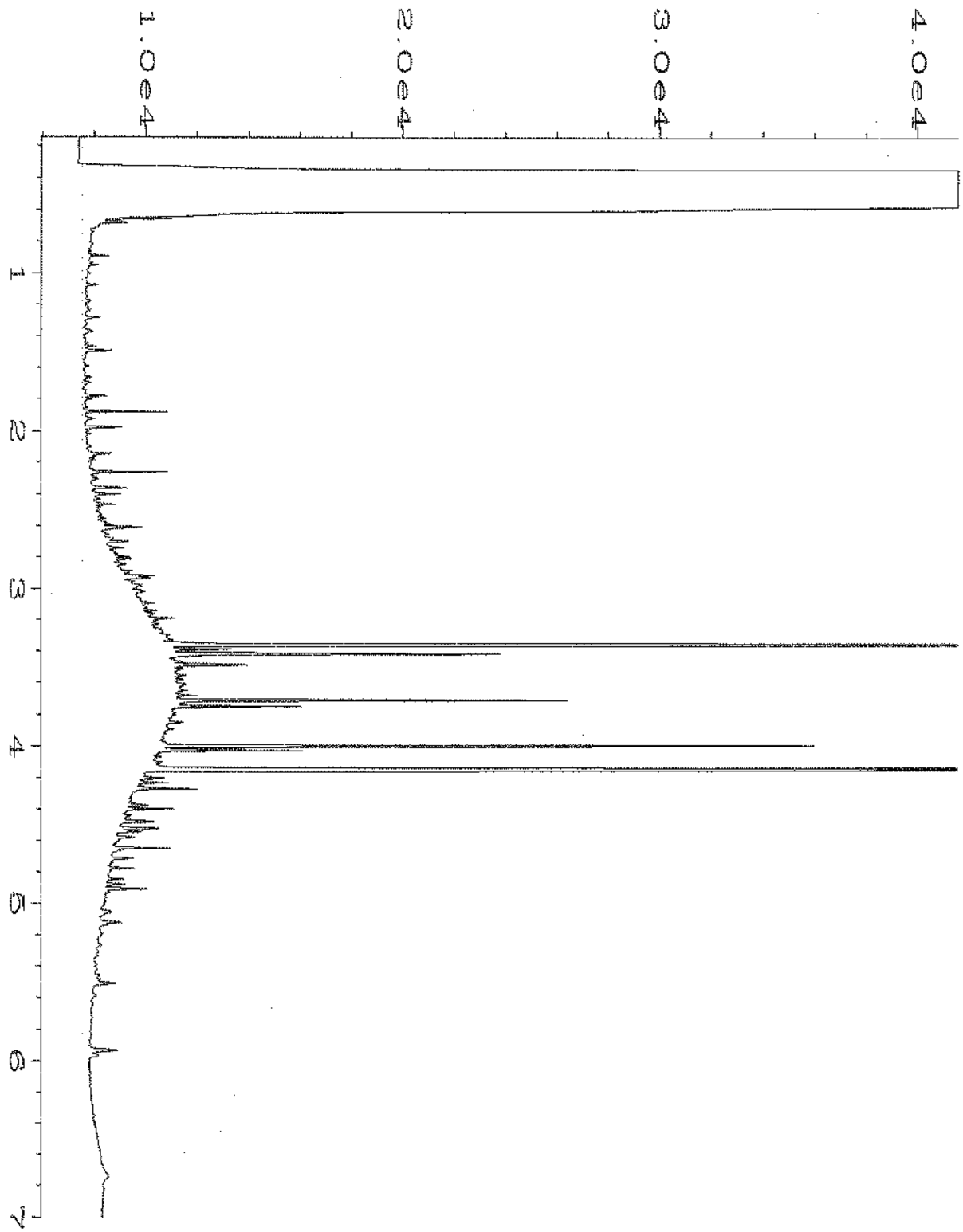


Data File Name : C:\HPCHEM\6\DATA\05-07-19\030F0501.D
Operator : TL
Instrument : GC6
Sample Name : 904600-13
Run Time Bar Code:
Acquired on : 07 May 19 06:31 PM
Report Created on: 08 May 19 11:17 AM

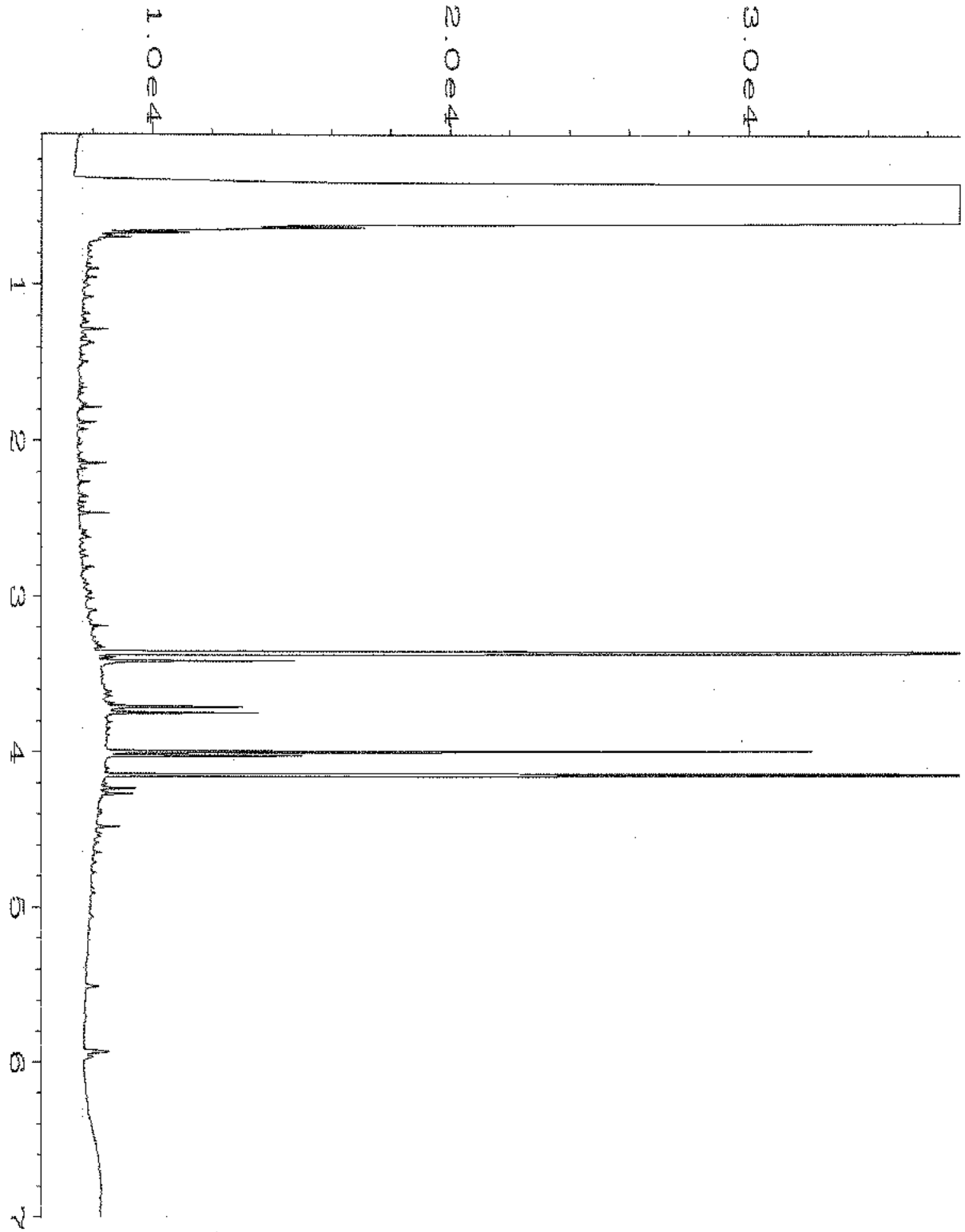
Page Number : 1
Vial Number : 30
Injection Number : 1
Sequence Line : 5
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name	: C:\HPCHEM\6\DATA\05-07-19\031F0701.D		
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 31
Sample Name	: 904600-14	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 7
Acquired on	: 07 May 19 07:05 PM	Instrument Method	: DX.MTH
Report Created on	: 08 May 19 11:17 AM	Analysis Method	: DX.MTH

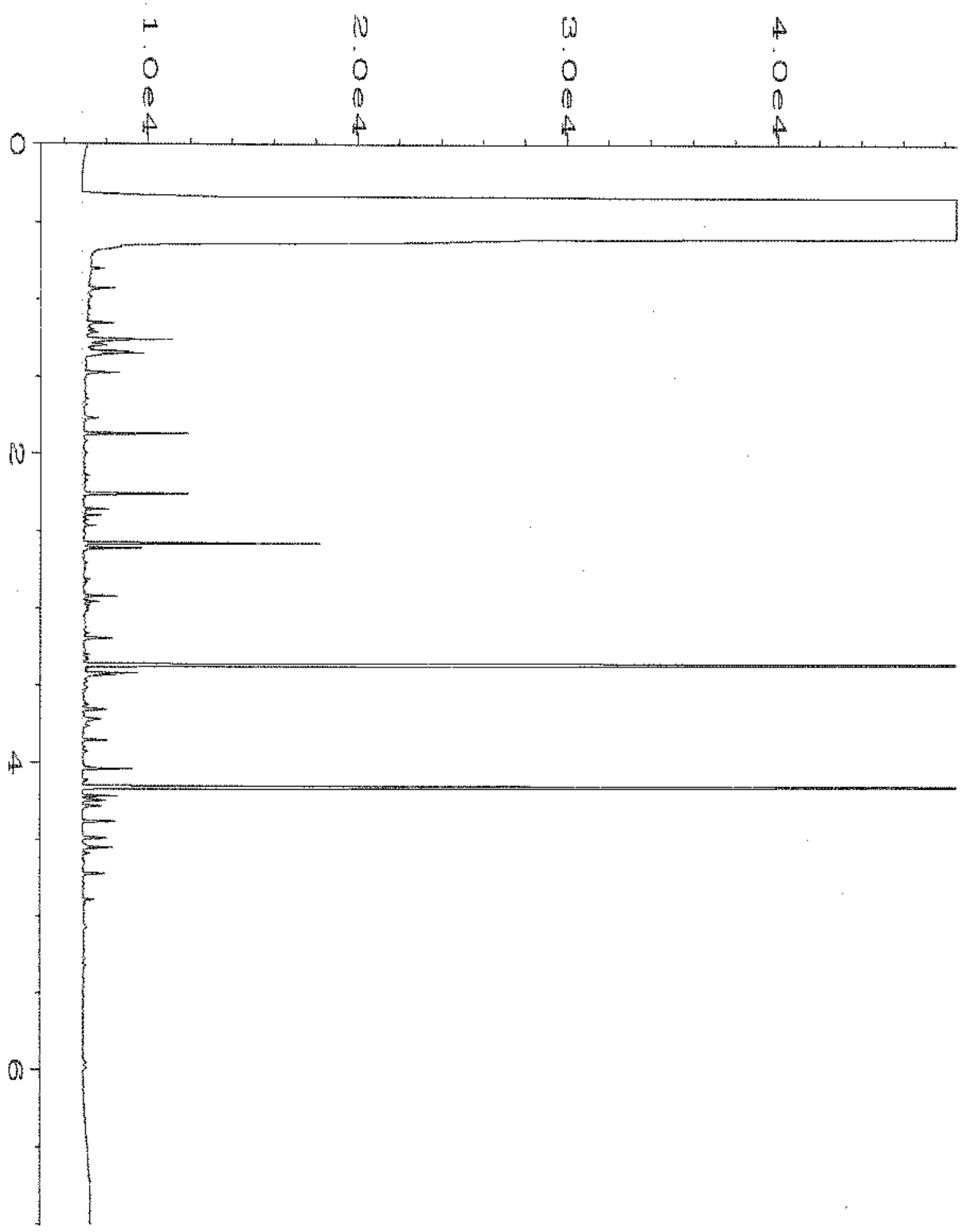


Data File Name	: C:\HPCHEM\6\DATA\05-07-19\032F0701.D		
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 32
Sample Name	: 904600-15	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 7
Acquired on	: 07 May 19 07:16 PM	Instrument Method	: DX.MTH
Report Created on	: 08 May 19 11:17 AM	Analysis Method	: DX.MTH

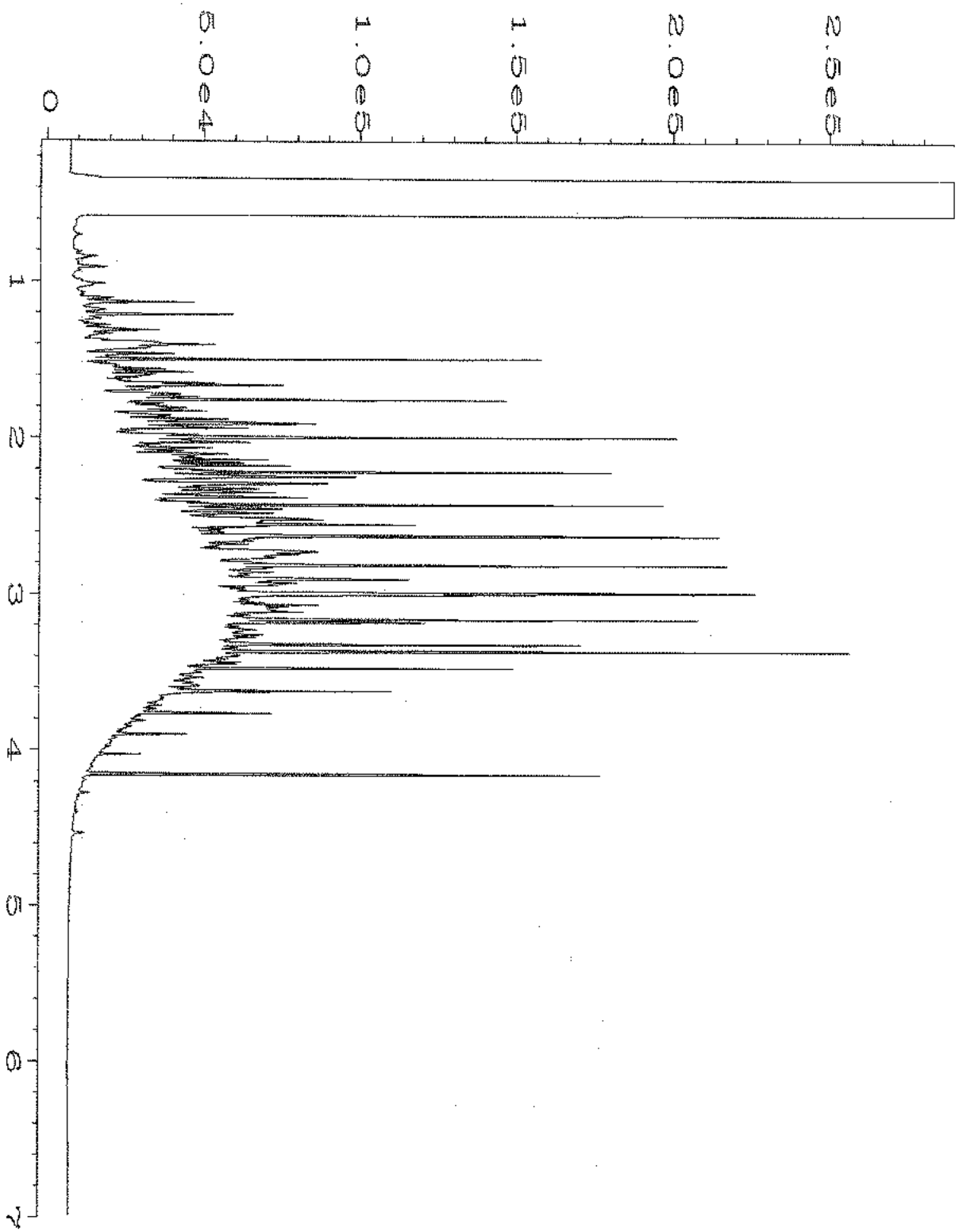


Data File Name : C:\HPCHEM\6\DATA\05-07-19\033F0701.D
Operator : TL
Instrument : GC6
Sample Name : 904600-17
Run Time Bar Code:
Acquired on : 07 May 19 07:27 PM
Report Created on: 08 May 19 11:18 AM

Page Number : 1
Vial Number : 33
Injection Number : 1
Sequence Line : 7
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name	: C:\HPCHEM\6\DATA\05-07-19\017F0501.D		
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 17
Sample Name	: 09-1004 mb2	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 07 May 19 04:10 PM	Instrument Method	: DX.MTH
Report Created on	: 08 May 19 11:18 AM	Analysis Method	: DX.MTH



Data File Name : C:\HPCHEM\6\DATA\05-07-19\005F0401.D
Operator : TL
Instrument : GC6
Sample Name : 1000 Dx 57-31B
Run Time Bar Code:
Acquired on : 07 May 19 02:36 PM
Report Created on: 08 May 19 11:18 AM

Page Number : 1
Vial Number : 5
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH

904600

SAMPLE CHAIN OF CUSTODY

ME 04/30/19

VWS/COC 1 of 2

Report To Lynn Grochala
Company Floyd Snider
Address 601 Union St, Ste 600
City, State, ZIP Seattle, WA 98101
Phone 206-292-2078 email lynn.grochala@floydsnider.com

SAMPLERS (*signature*)

PROJECT NAME: Cantera - TOC

PO #

REMARKS

INVOICE TO

Page # 1 of 2

TURNAROUND TIME
- ☒ Standard Turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☒ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	Penta	VPH + Naph	EPH + Naph		Notes
01MW01-043019	01A-F	4/30/19	1150	W	6		X	X	X				X	X	X		Yes penta
01MW06-043019	02A-D		1453		4		X	X	X								
01MW12-043019	03A-D		1515		4		X	X	X								
01MW19-043019	04A-I		1429		9		X	X	X	X				X	X		
01MW24-043019	05A-D		1145		4		X	X	X								
01MW27-043019	06A-F		1305		6		X	X	X				X				
01MW37-043019	07		1415		1		X										
01MW38-043019	08A-D		1536		4		X		X								
01MW39-043019	09		1705		1		X										
01MW40-043019	10A-D	↓	1710	↓	4		X		X								

ANALYSES REQUESTED

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kara Hitchko	Floyd Snider	4/30/19	17:57
Received by:	Liz Webber-Bruya	F.B.I	4/30/19	1757
Relinquished by:				
Received by:		Samples received at 4 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SAMPLE CHAIN OF CUSTODY

ME 04/30/19 rvsd/ COC

904600

Page # 2 of 2

Report To Lynn Grochala

Company Floyd Snider

Address (See p1)

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME: Cantera - TOC

PO #

REMARKS

INVOICE TO

TURNAROUND TIME
- ☒ Standard Turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☒ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	Ponta	VPHs+ targets	EPHs+ targets		Notes
01 MW42-043019	11	4/30/19	1345	W	1		X										
01 MW59-043019	12		1455		1		X										
01 MW66-043019	13 A-F		1142		6		X	X	X				X				
01 MW420-043019	14		1545		1		X										
01 MW67-043019	15 A-C		1158		3		X						X				
01 MW69-043019	16 A-H		1146		10								X	X	X		
01 MW74-043019	17 A-F		1550		6		X	X	X				X				
trip blanks	18 A-C		1415		3			X	X								

ANALYSES REQUESTED

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kara Hitchlco	Floyd Snider	4/30/19	17:57
Received by:	Liz Webber-Bryc	F?B	4/30/19	1757
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 904600
Work Order Number: 1905010

June 06, 2019

Attention Michael Erdahl:

Fremont Analytical, Inc. received 2 sample(s) on 5/1/2019 for the analyses presented in the following report.

Extractable Petroleum Hydrocarbons by NWEPH
Volatile Petroleum Hydrocarbons by NWVPH

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

Date: *06/06/2019*

CLIENT: Friedman & Bruya
Project: 904600
Work Order: 1905010

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1905010-001	01MW19-043019	04/30/2019 2:29 PM	05/01/2019 12:20 PM
1905010-002	01MW69-043019	04/30/2019 11:42 AM	05/01/2019 12:20 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **1905010**
Date: **6/6/2019**

CLIENT: Friedman & Bruya
Project: 904600

WorkOrder Narrative:
I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Revision 1: Incorrect spike values were listed on the the original report for the LCS Duplicate.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **1905010**
Date Reported: **6/6/2019**

Client: Friedman & Bruya
Collection Date: 4/30/2019 2:29:00 PM
Project: 904600
Lab ID: 1905010-001
Matrix: Water
Client Sample ID: **01MW19-043019**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 24488		Analyst: DW
Aliphatic Hydrocarbon (C10-C12)	ND	20.7	*	µg/L	1	5/15/2019 6:19:00 AM
Aliphatic Hydrocarbon (C12-C16)	47.7	20.7		µg/L	1	5/15/2019 6:19:00 AM
Aliphatic Hydrocarbon (C16-C21)	33.9	20.7		µg/L	1	5/15/2019 6:19:00 AM
Aliphatic Hydrocarbon (C21-C34)	ND	20.7		µg/L	1	5/15/2019 6:19:00 AM
Aliphatic Hydrocarbon (C8-C10)	60.2	41.5	*	µg/L	1	5/15/2019 6:19:00 AM
Aromatic Hydrocarbon (C10-C12)	386	20.7		µg/L	1	5/14/2019 9:32:00 PM
Aromatic Hydrocarbon (C12-C16)	524	20.7		µg/L	1	5/14/2019 9:32:00 PM
Aromatic Hydrocarbon (C16-C21)	353	20.7		µg/L	1	5/14/2019 9:32:00 PM
Aromatic Hydrocarbon (C21-C34)	497	20.7		µg/L	1	5/14/2019 9:32:00 PM
Aromatic Hydrocarbon (C8-C10)	569	20.7	*	µg/L	1	5/14/2019 9:32:00 PM
Surr: 1-Chlorooctadecane	84.9	60 - 140		%Rec	1	5/15/2019 6:19:00 AM
Surr: o-Terphenyl	73.7	60 - 140		%Rec	1	5/14/2019 9:32:00 PM

NOTES:
* - Flagged value is not within established control limits.

Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 24372		Analyst: CR
Aliphatic Hydrocarbon (C5-C6)	1,710	40.0		µg/L	1	5/1/2019 10:05:45 PM
Aliphatic Hydrocarbon (C6-C8)	644	400	D	µg/L	20	5/1/2019 7:21:38 PM
Aliphatic Hydrocarbon (C8-C10)	ND	20.0		µg/L	1	5/1/2019 10:05:45 PM
Aliphatic Hydrocarbon (C10-C12)	365	20.0		µg/L	1	5/1/2019 10:05:45 PM
Aromatic Hydrocarbon (C8-C10)	1,840	50.0		µg/L	1	5/1/2019 10:05:45 PM
Aromatic Hydrocarbon (C10-C12)	804	20.0		µg/L	1	5/1/2019 10:05:45 PM
Aromatic Hydrocarbon (C12-C13)	998	20.0		µg/L	1	5/1/2019 10:05:45 PM
Benzene	2,610	400	D	µg/L	20	5/1/2019 7:21:38 PM
Toluene	82.9	20.0		µg/L	1	5/1/2019 10:05:45 PM
Ethylbenzene	683	20.0		µg/L	1	5/1/2019 10:05:45 PM
m,p-Xylene	610	40.0		µg/L	1	5/1/2019 10:05:45 PM
o-Xylene	26.0	20.0		µg/L	1	5/1/2019 10:05:45 PM
Naphthalene	204	20.0		µg/L	1	5/1/2019 10:05:45 PM
Methyl tert-butyl ether (MTBE)	154	20.0	Q	µg/L	1	5/1/2019 10:05:45 PM
Surr: 1,4-Difluorobenzene	101	65 - 140	D	%Rec	20	5/1/2019 7:21:38 PM
Surr: Bromofluorobenzene	107	65 - 140		%Rec	1	5/1/2019 10:05:45 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria

Analytical Report

Work Order: **1905010**
Date Reported: **6/6/2019**

Client: Friedman & Bruya
Collection Date: 4/30/2019 11:42:00 AM
Project: 904600
Lab ID: 1905010-002
Matrix: Water
Client Sample ID: **01MW69-043019**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 24488		Analyst: DW
Aliphatic Hydrocarbon (C10-C12)	ND	20.4	*	µg/L	1	5/15/2019 7:03:00 AM
Aliphatic Hydrocarbon (C12-C16)	ND	20.4		µg/L	1	5/15/2019 7:03:00 AM
Aliphatic Hydrocarbon (C16-C21)	ND	20.4		µg/L	1	5/15/2019 7:03:00 AM
Aliphatic Hydrocarbon (C21-C34)	ND	20.4		µg/L	1	5/15/2019 7:03:00 AM
Aliphatic Hydrocarbon (C8-C10)	ND	40.9	*	µg/L	1	5/15/2019 7:03:00 AM
Aromatic Hydrocarbon (C10-C12)	65.3	20.4		µg/L	1	5/14/2019 10:16:00 PM
Aromatic Hydrocarbon (C12-C16)	73.5	20.4		µg/L	1	5/14/2019 10:16:00 PM
Aromatic Hydrocarbon (C16-C21)	124	20.4		µg/L	1	5/14/2019 10:16:00 PM
Aromatic Hydrocarbon (C21-C34)	90.6	20.4		µg/L	1	5/14/2019 10:16:00 PM
Aromatic Hydrocarbon (C8-C10)	ND	20.4	*	µg/L	1	5/14/2019 10:16:00 PM
Surr: 1-Chlorooctadecane	72.1	60 - 140		%Rec	1	5/15/2019 7:03:00 AM
Surr: o-Terphenyl	72.9	60 - 140		%Rec	1	5/14/2019 10:16:00 PM

NOTES:
* - Flagged value is not within established control limits.

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 24372		Analyst: CR
Aliphatic Hydrocarbon (C5-C6)	ND	40.0		µg/L	1	5/1/2019 10:46:53 PM
Aliphatic Hydrocarbon (C6-C8)	64.6	20.0		µg/L	1	5/1/2019 10:46:53 PM
Aliphatic Hydrocarbon (C8-C10)	51.5	20.0		µg/L	1	5/1/2019 10:46:53 PM
Aliphatic Hydrocarbon (C10-C12)	ND	20.0		µg/L	1	5/1/2019 10:46:53 PM
Aromatic Hydrocarbon (C8-C10)	101	50.0		µg/L	1	5/1/2019 10:46:53 PM
Aromatic Hydrocarbon (C10-C12)	198	20.0		µg/L	1	5/1/2019 10:46:53 PM
Aromatic Hydrocarbon (C12-C13)	308	20.0		µg/L	1	5/1/2019 10:46:53 PM
Benzene	ND	20.0		µg/L	1	5/1/2019 10:46:53 PM
Toluene	ND	20.0		µg/L	1	5/1/2019 10:46:53 PM
Ethylbenzene	ND	20.0		µg/L	1	5/1/2019 10:46:53 PM
m,p-Xylene	ND	40.0		µg/L	1	5/1/2019 10:46:53 PM
o-Xylene	ND	20.0		µg/L	1	5/1/2019 10:46:53 PM
Naphthalene	ND	20.0		µg/L	1	5/1/2019 10:46:53 PM
Methyl tert-butyl ether (MTBE)	ND	20.0		µg/L	1	5/1/2019 10:46:53 PM
Surr: 1,4-Difluorobenzene	107	65 - 140		%Rec	1	5/1/2019 10:46:53 PM
Surr: Bromofluorobenzene	109	65 - 140		%Rec	1	5/1/2019 10:46:53 PM

Work Order: 1905010
CLIENT: Friedman & Bruya
Project: 904600

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID **MB-24488** SampType: **MBLK** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **MBLKW** Batch ID: **24488** Analysis Date: **5/14/2019** SeqNo: **1013513**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	ND	20.1		0	0						
Aromatic Hydrocarbon (C12-C16)	ND	20.1		0	0						
Aromatic Hydrocarbon (C16-C21)	ND	20.1		0	0						
Aromatic Hydrocarbon (C21-C34)	ND	20.1		0	0						
Aromatic Hydrocarbon (C8-C10)	ND	20.1		0	0						*
Surr: o-Terphenyl	1,420		2,010		70.7	60	140				

NOTES:
* - Flagged value is not within established control limits.

Sample ID **LCS-24488** SampType: **LCS** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW** Batch ID: **24488** Analysis Date: **5/14/2019** SeqNo: **1013510**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	1,770	19.9	2,489	0	70.9	70	130				
Aromatic Hydrocarbon (C12-C16)	1,960	19.9	2,489	0	78.7	70	130				
Aromatic Hydrocarbon (C16-C21)	2,160	19.9	2,489	0	86.7	70	130				
Aromatic Hydrocarbon (C21-C34)	2,320	19.9	2,489	0	93.1	70	130				
Aromatic Hydrocarbon (C8-C10)	1,460	19.9	2,489	0	58.8	70	130				S
Surr: o-Terphenyl	1,450		1,991		72.8	60	140				

NOTES:
S - Outlying spike recovery observed (low bias). Samples will be qualified with a *.

Sample ID **LCSD-24488** SampType: **LCSD** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW02** Batch ID: **24488** Analysis Date: **5/14/2019** SeqNo: **1013511**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	1,820	20.0	2,504	0	72.6	70	130	1,766	2.95	20	
Aromatic Hydrocarbon (C12-C16)	2,130	20.0	2,504	0	84.9	70	130	1,959	8.25	20	
Aromatic Hydrocarbon (C16-C21)	2,210	20.0	2,504	0	88.1	70	130	2,157	2.29	20	
Aromatic Hydrocarbon (C21-C34)	2,270	20.0	2,504	0	90.7	70	130	2,317	2.00	20	
Aromatic Hydrocarbon (C8-C10)	1,480	20.0	2,504	0	59.1	70	130	1,464	1.05	20	S
Surr: o-Terphenyl	1,540		2,003		77.0	60	140		0		

Work Order: 1905010
CLIENT: Friedman & Bruya
Project: 904600

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID **LCSD-24488** SampType: **LCSD** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW02** Batch ID: **24488** Analysis Date: **5/14/2019** SeqNo: **1013511**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

NOTES:
S - Outlying spike recovery observed (low bias). Samples will be qualified with a *.

Sample ID **MB-24488** SampType: **MBLK** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **MBLKW** Batch ID: **24488** Analysis Date: **5/15/2019** SeqNo: **1013559**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	ND	20.1		0	0						*
Aliphatic Hydrocarbon (C12-C16)	ND	20.1		0	0						
Aliphatic Hydrocarbon (C16-C21)	ND	20.1		0	0						
Aliphatic Hydrocarbon (C21-C34)	ND	20.1		0	0						
Aliphatic Hydrocarbon (C8-C10)	ND	40.2		0	0						*
Surr: 1-Chlorooctadecane	1,510		2,010		75.1	60	140				

NOTES:
* - Flagged value is not within established control limits.

Sample ID **LCS-24488** SampType: **LCS** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW** Batch ID: **24488** Analysis Date: **5/15/2019** SeqNo: **1013557**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	1,520	19.9	2,489	0	60.9	70	130				S
Aliphatic Hydrocarbon (C12-C16)	1,880	19.9	2,489	0	75.7	70	130				
Aliphatic Hydrocarbon (C16-C21)	2,050	19.9	2,489	0	82.2	70	130				
Aliphatic Hydrocarbon (C21-C34)	4,050	19.9	4,979	0	81.3	70	130				
Aliphatic Hydrocarbon (C8-C10)	785	39.8	2,489	0	31.5	70	130				S
Surr: 1-Chlorooctadecane	1,590		1,991		80.0	60	140				

NOTES:
S - Outlying spike recovery observed (Aliphatic Hydrocarbon (C8-C10) and (C10-C12) - low bias. Samples will be qualified with a *.

Work Order: 1905010
CLIENT: Friedman & Bruya
Project: 904600

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID **LCSD-24488** SampType: **LCSD** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW02** Batch ID: **24488** Analysis Date: **5/15/2019** SeqNo: **1013558**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	1,540	20.0	2,504	0	61.6	70	130	1,516	1.73	20	S
Aliphatic Hydrocarbon (C12-C16)	1,550	20.0	2,504	0	61.8	70	130	1,885	19.7	20	S
Aliphatic Hydrocarbon (C16-C21)	1,980	20.0	2,504	0	79.2	70	130	2,047	3.15	20	
Aliphatic Hydrocarbon (C21-C34)	3,450	20.0	5,008	0	68.9	70	130	4,048	15.9	20	S
Aliphatic Hydrocarbon (C8-C10)	735	40.1	2,504	0	29.4	70	130	784.9	6.52	20	S
Surr: 1-Chlorooctadecane	1,400		2,003		69.8	60	140		0		

NOTES:
S - Outlying spike recovery(ies) observed. A duplicate analysis was performed and recovered within range (Aliphatic Hydrocarbon (C12-C16), (C16-C21), and (C21-C34)).
S - Outlying spike recovery observed (Aliphatic Hydrocarbon (C8-C10) and (C10-C12) - low bias. Samples will be qualified with a *.

Sample ID **1905093-001ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **BATCH** Batch ID: **24488** Analysis Date: **5/16/2019** SeqNo: **1015489**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	ND	25.4		0	0			0		25	*
Aliphatic Hydrocarbon (C12-C16)	ND	25.4		0	0			0		25	
Aliphatic Hydrocarbon (C16-C21)	ND	25.4		0	0			0		25	
Aliphatic Hydrocarbon (C21-C34)	ND	25.4		0	0			0		25	
Aliphatic Hydrocarbon (C8-C10)	ND	50.8		0	0			0		25	*
Surr: 1-Chlorooctadecane	2,270		2,540		89.3	60	140		0		

NOTES:
* - Flagged value is not within established control limits.

Sample ID **1905093-001ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **BATCH** Batch ID: **24488** Analysis Date: **5/17/2019** SeqNo: **1015495**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	ND	25.4		0	0			0		25	
Aromatic Hydrocarbon (C12-C16)	41.7	25.4		0	0			22.91	58.1	25	
Aromatic Hydrocarbon (C16-C21)	ND	25.4		0	0			0		25	
Aromatic Hydrocarbon (C21-C34)	ND	25.4		0	0			0		25	
Aromatic Hydrocarbon (C8-C10)	ND	25.4		0	0			0		25	*

Work Order: 1905010
CLIENT: Friedman & Bruya
Project: 904600

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID **1905093-001ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **BATCH** Batch ID: **24488** Analysis Date: **5/17/2019** SeqNo: **1015495**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: o-Terphenyl	1,830		2,540		71.9	60	140		0		

Work Order: 1905010
CLIENT: Friedman & Bruya
Project: 904600

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID **LCS-24372** SampType: **LCS** Units: **µg/L** Prep Date: **5/1/2019** RunNo: **51220**
Client ID: **LCSW** Batch ID: **24372** Analysis Date: **5/1/2019** SeqNo: **1007691**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	605	40.0	600.0	0	101	70	130				
Aliphatic Hydrocarbon (C6-C8)	210	20.0	200.0	0	105	70	130				
Aliphatic Hydrocarbon (C8-C10)	201	20.0	200.0	0	100	70	130				
Aliphatic Hydrocarbon (C10-C12)	201	20.0	200.0	0	101	70	130				
Aromatic Hydrocarbon (C8-C10)	780	50.0	800.0	0	97.5	70	130				
Aromatic Hydrocarbon (C10-C12)	196	20.0	200.0	0	98.1	70	130				
Aromatic Hydrocarbon (C12-C13)	202	20.0	200.0	0	101	70	130				
Benzene	194	20.0	200.0	0	97.0	70	130				
Toluene	194	20.0	200.0	0	97.2	70	130				
Ethylbenzene	195	20.0	200.0	0	97.7	70	130				
m,p-Xylene	394	40.0	400.0	0	98.6	70	130				
o-Xylene	196	20.0	200.0	0	98.2	70	130				
Naphthalene	190	20.0	200.0	0	95.2	70	130				
Methyl tert-butyl ether (MTBE)	259	20.0	200.0	0	130	70	130				
Surr: 1,4-Difluorobenzene	52.3		50.00		105	65	140				
Surr: Bromofluorobenzene	51.6		50.00		103	65	140				

Sample ID **LCSD-24372** SampType: **LCSD** Units: **µg/L** Prep Date: **5/1/2019** RunNo: **51220**
Client ID: **LCSW02** Batch ID: **24372** Analysis Date: **5/1/2019** SeqNo: **1007692**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	596	40.0	600.0	0	99.4	70	130	605.5	1.50	20	
Aliphatic Hydrocarbon (C6-C8)	204	20.0	200.0	0	102	70	130	210.3	3.07	20	
Aliphatic Hydrocarbon (C8-C10)	199	20.0	200.0	0	99.5	70	130	200.6	0.803	20	
Aliphatic Hydrocarbon (C10-C12)	208	20.0	200.0	0	104	70	130	201.4	3.34	20	
Aromatic Hydrocarbon (C8-C10)	789	50.0	800.0	0	98.7	70	130	779.9	1.21	20	
Aromatic Hydrocarbon (C10-C12)	205	20.0	200.0	0	102	70	130	196.2	4.39	20	
Aromatic Hydrocarbon (C12-C13)	221	20.0	200.0	0	110	70	130	201.9	9.00	20	
Benzene	190	20.0	200.0	0	94.9	70	130	194.0	2.18	20	
Toluene	190	20.0	200.0	0	95.2	70	130	194.4	2.07	20	

Work Order: 1905010
CLIENT: Friedman & Bruya
Project: 904600

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID **LCSD-24372** SampType: **LCSD** Units: **µg/L** Prep Date: **5/1/2019** RunNo: **51220**
Client ID: **LCSW02** Batch ID: **24372** Analysis Date: **5/1/2019** SeqNo: **1007692**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethylbenzene	191	20.0	200.0	0	95.7	70	130	195.4	2.09	20	
m,p-Xylene	387	40.0	400.0	0	96.7	70	130	394.4	1.92	20	
o-Xylene	194	20.0	200.0	0	96.8	70	130	196.3	1.44	20	
Naphthalene	200	20.0	200.0	0	100	70	130	190.4	5.08	20	
Methyl tert-butyl ether (MTBE)	327	20.0	200.0	0	164	70	130	259.1	23.2	20	RS
Surr: 1,4-Difluorobenzene	53.8		50.00		108	65	140		0		
Surr: Bromofluorobenzene	53.6		50.00		107	65	140		0		

NOTES:
S - Outlying spike recovery(ies) observed. A duplicate analysis was performed and recovered within range.
R - High RPD observed. The method is in control as indicated by the LCS.

Sample ID **MB-24372** SampType: **MBLK** Units: **µg/L** Prep Date: **5/1/2019** RunNo: **51220**
Client ID: **MBLKW** Batch ID: **24372** Analysis Date: **5/1/2019** SeqNo: **1007693**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	ND	40.0		0	0						
Aliphatic Hydrocarbon (C6-C8)	ND	20.0		0	0						
Aliphatic Hydrocarbon (C8-C10)	ND	20.0		0	0						
Aliphatic Hydrocarbon (C10-C12)	ND	20.0		0	0						
Aromatic Hydrocarbon (C8-C10)	ND	50.0		0	0						
Aromatic Hydrocarbon (C10-C12)	ND	20.0		0	0						
Aromatic Hydrocarbon (C12-C13)	ND	20.0		0	0						
Benzene	ND	20.0		0	0						
Toluene	ND	20.0		0	0						
Ethylbenzene	ND	20.0		0	0						
m,p-Xylene	ND	40.0		0	0						
o-Xylene	ND	20.0		0	0						
Naphthalene	ND	20.0		0	0						
Methyl tert-butyl ether (MTBE)	ND	20.0		0	0						
Surr: 1,4-Difluorobenzene	49.0		50.00		98.0	65	140				
Surr: Bromofluorobenzene	49.9		50.00		99.8	65	140				

Work Order: 1905010
CLIENT: Friedman & Bruya
Project: 904600

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID **MB-24372**	SampType: **MBLK**			Units: **µg/L**		Prep Date: **5/1/2019**			RunNo: **51220**		
Client ID: **MBLKW**	Batch ID: **24372**					Analysis Date: **5/1/2019**			SeqNo: **1007693**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID **1905010-002BDUP**	SampType: **DUP**			Units: **µg/L**		Prep Date: **5/1/2019**			RunNo: **51220**		
Client ID: **01MW69-043019**	Batch ID: **24372**					Analysis Date: **5/1/2019**			SeqNo: **1007688**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	ND	800		0	0			0		25	D
Aliphatic Hydrocarbon (C6-C8)	ND	400		0	0			0		25	D
Aliphatic Hydrocarbon (C8-C10)	ND	400		0	0			0		25	D
Aliphatic Hydrocarbon (C10-C12)	ND	400		0	0			0		25	D
Aromatic Hydrocarbon (C8-C10)	ND	1,000		0	0			0		25	D
Aromatic Hydrocarbon (C10-C12)	ND	400		0	0			0		25	D
Aromatic Hydrocarbon (C12-C13)	ND	400		0	0			0		25	D
Benzene	ND	400		0	0			0		25	D
Toluene	ND	400		0	0			0		25	D
Ethylbenzene	ND	400		0	0			0		25	D
m,p-Xylene	ND	800		0	0			0		25	D
o-Xylene	ND	400		0	0			0		25	D
Naphthalene	ND	400		0	0			0		25	D
Methyl tert-butyl ether (MTBE)	ND	400		0	0			0		25	D
Surr: 1,4-Difluorobenzene	1,070		1,000		107	65	140		0		D
Surr: Bromofluorobenzene	1,100		1,000		110	65	140		0		D

Sample Log-In Check List

Client Name:	**FB**	Work Order Number:	**1905010**
Logged by:	**Brianna Barnes**	Date Received:	**5/1/2019 12:20:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >0°C to 10.0°C*	Yes ☑	No ☐	NA ☐
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☑	NA ☐
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Cooler	7.8
Sample	7.1

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

1905010

Page # 1 of 1

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 Fax # (206) 283-5044

SUBCONTRACTER Fremont

PROJECT NAME/NO.	PO #
904600	B-248

REMARKS Flag (Snyder EDD

Please Email Results

TURNAROUND TIME

☒ Standard (2 Weeks)

☐ RUSH

Rush charges authorized by:

SAMPLE DISPOSAL

☐ Dispose after 30 days

☐ Return samples

☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: Dioxins/Furans	EPH	VPH							Notes
01MW19-043019		4/30/19	1429	H_2O	4		x	x							
01MW69-043019		4/30/19	1142	↓	4		x	x							

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Michael Erdahl	Friedman & Bruya	5/1/19	10:30AM
Received by:	ClarkSaint	FAT	5/1/19	1220
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 22, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included is the amended report from the testing of material submitted on May 1, 2019 from the Cantera-TOC, F&BI 905024 project. The 8021B benzene reporting limits were lowered to meet the QAPP requirements. In addition, hexane was added to the 8260C analyte list.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0517R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

May 17, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on May 1, 2019 from the Cantera-TOC, F&BI 905024 project. There are 24 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0517R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on May 1, 2019 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera-TOC, F&BI 905024 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
905024 -01	01MW02-050119
905024 -02	01MW03-050119
905024 -03	01MW03D-050119
905024 -04	01MW11-050119
905024 -05	01MW13-050119
905024 -06	01MW34-050119
905024 -07	01MW35-050119
905024 -08	01MW36-050119
905024 -09	01MW47-050119
905024 -10	01MW48-050119
905024 -11	01MW50-050119
905024 -12	01MW51-050119
905024 -13	01MW75-050119
905024 -14	01MW86-050119
905024 -15	01MW87-050119
905024 -16	01MW88-050119
905024 -17	01MW84-050119
905024 -18	01MW90-050119
905024 -19	01MW99-050119
905024 -20	01MW100-050119
905024 -21	Trip Blank

The 8021B benzene reporting limit was reported below the lowest calibration point for several samples. The data were qualified accordingly.

The 8270D surrogate 2-fluorophenol did not pass the acceptance criteria in sample 01MW48-050119. That surrogate is not associated with pentachlorophenol, therefore the data were acceptable.

All other quality control requirements were acceptable.

Date of Report: 05/17/19
Date Received: 05/01/19
Project: Cantera-TOC, F&BI 905024
Date Extracted: 05/06/19
Date Analyzed: 05/06/19 and 05/07/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
01MW02-050119 905024-01	220	2.8	5.1	5.6	900	84
01MW03-050119 905024-02	570	6.2	1.3	6.3	2,000	89
01MW03D-050119 905024-03	610	5.3	1.0	5.0	1,900	84
01MW13-050119 905024-05	<0.35 j	<1	<1	<3	<100	103
01MW35-050119 905024-07	<0.35 j	<1	<1	<3	<100	81
01MW48-050119 905024-10	<0.35 j	<1	<1	<3	<100	81
01MW51-050119 905024-12	<0.35 j	<1	<1	<3	<100	83
01MW86-050119 905024-14	1,200	19	130	580	6,500	100
01MW84-050119 905024-17 1/5	<5	7.5	390	250	8,400	104
Trip Blank 905024-21	<0.35 j	<1	<1	<3	<100	82
Method Blank 09-830 MB	<0.35 j	<1	<1	<3	<100	85

Date of Report: 05/17/19
Date Received: 05/01/19
Project: Cantera-TOC, F&BI 905024
Date Extracted: 05/06/19
Date Analyzed: 05/06/19

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
USING METHOD 8021B**

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Surrogate (% Recovery) Limit (52-124)
01MW75-050119 905024-13	<0.35 j	<1	<1	<3	83
Method Blank 09-830 MB	<0.35 j	<1	<1	<3	85

Date of Report: 05/17/19
Date Received: 05/01/19
Project: Cantera-TOC, F&BI 905024
Date Extracted: 05/08/19
Date Analyzed: 05/08/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
01MW02-050119 905024-01	740 x	<250	91
01MW03-050119 905024-02	440 x	<250	95
01MW03D-050119 905024-03	440 x	<250	93
01MW11-050119 905024-04	360 x	<250	99
01MW13-050119 905024-05	1,500 x	650 x	100
01MW34-050119 905024-06	110 x	<250	91
01MW35-050119 905024-07	550 x	<250	86
01MW36-050119 905024-08	190 x	<250	96
01MW48-050119 905024-10	660 x	<250	93
01MW50-050119 905024-11	390 x	<250	102
01MW51-050119 905024-12 1/1.2	850 x	<250	104
01MW75-050119 905024-13	740 x	<250	94

Date of Report: 05/17/19
Date Received: 05/01/19
Project: Cantera-TOC, F&BI 905024
Date Extracted: 05/08/19
Date Analyzed: 05/08/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
01MW86-050119 905024-14 1/1.2	3,700 x	420 x	96
01MW87-050119 905024-15 1/1.2	110 x	<300	99
01MW88-050119 905024-16 1/2	140 x	<500	110
01MW84-050119 905024-17	2,800 x	<250	99
01MW99-050119 905024-19	570 x	<250	94
01MW100-050119 905024-20	<50	<250	99
Method Blank 09-1060 MB	<50	<250	98

Analysis for Semivolatile Phenols By EPA Method 8270D SIM

Client Sample ID:	01MW48-050119	Client:	Floyd-Snider
Date Received:	05/01/19	Project:	Cantera-TOC, F&BI 905024
Date Extracted:	05/07/19	Lab ID:	905024-10
Date Analyzed:	05/09/19	Data File:	050913.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	16 vo	17	97
Phenol-d6	21	10	62
2,4,6-Tribromophenol	141	33	166

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<0.2

Analysis for Semivolatile Phenols By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 905024
Date Extracted:	05/07/19	Lab ID:	09-1048 mb
Date Analyzed:	05/09/19	Data File:	050907.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	18	17	97
Phenol-d6	28	10	62
2,4,6-Tribromophenol	90	33	166

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<0.2

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	01MW47-050119	Client:	Floyd-Snider
Date Received:	05/01/19	Project:	Cantera-TOC, F&BI 905024
Date Extracted:	05/02/19	Lab ID:	905024-09 1/2
Date Analyzed:	05/03/19	Data File:	050315.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	94	31	160
Benzo(a)anthracene-d12	100	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	71 ve
Acenaphthylene	<0.04
Acenaphthene	5.3
Fluorene	6.2
Phenanthrene	6.0
Anthracene	0.49
Fluoranthene	<0.04
Pyrene	0.048
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.04
1-Methylnaphthalene	150 ve
2-Methylnaphthalene	220 ve

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	01MW47-050119	Client:	Floyd-Snider
Date Received:	05/01/19	Project:	Cantera-TOC, F&BI 905024
Date Extracted:	05/02/19	Lab ID:	905024-09 1/200
Date Analyzed:	05/06/19	Data File:	050617.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	20 d	31	160
Benzo(a)anthracene-d12	94 d	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	77
Acenaphthylene	<4
Acenaphthene	5.3
Fluorene	5.8
Phenanthrene	6.0
Anthracene	<4
Fluoranthene	<4
Pyrene	<4
Benz(a)anthracene	<4
Chrysene	<4
Benzo(a)pyrene	<4
Benzo(b)fluoranthene	<4
Benzo(k)fluoranthene	<4
Indeno(1,2,3-cd)pyrene	<4
Dibenz(a,h)anthracene	<4
Benzo(g,h,i)perylene	<4
1-Methylnaphthalene	150
2-Methylnaphthalene	230

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	01MW88-050119	Client:	Floyd-Snider
Date Received:	05/01/19	Project:	Cantera-TOC, F&BI 905024
Date Extracted:	05/02/19	Lab ID:	905024-16 1/2
Date Analyzed:	05/03/19	Data File:	050313.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	92	31	160
Benzo(a)anthracene-d12	101	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.4
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.04
1-Methylnaphthalene	<0.4
2-Methylnaphthalene	<0.4

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	01MW84-050119	Client:	Floyd-Snider
Date Received:	05/01/19	Project:	Cantera-TOC, F&BI 905024
Date Extracted:	05/02/19	Lab ID:	905024-17 1/2
Date Analyzed:	05/03/19	Data File:	050316.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	94	31	160
Benzo(a)anthracene-d12	103	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	190 ve
Acenaphthylene	<0.04
Acenaphthene	3.4
Fluorene	3.1
Phenanthrene	4.2
Anthracene	0.44
Fluoranthene	0.25
Pyrene	0.12
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.04
1-Methylnaphthalene	81 ve
2-Methylnaphthalene	130 ve

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	01MW84-050119	Client:	Floyd-Snider
Date Received:	05/01/19	Project:	Cantera-TOC, F&BI 905024
Date Extracted:	05/02/19	Lab ID:	905024-17 1/200
Date Analyzed:	05/06/19	Data File:	050618.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	20 d	31	160
Benzo(a)anthracene-d12	86 d	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	190
Acenaphthylene	<4
Acenaphthene	<4
Fluorene	<4
Phenanthrene	<4
Anthracene	<4
Fluoranthene	<4
Pyrene	<4
Benz(a)anthracene	<4
Chrysene	<4
Benzo(a)pyrene	<4
Benzo(b)fluoranthene	<4
Benzo(k)fluoranthene	<4
Indeno(1,2,3-cd)pyrene	<4
Dibenz(a,h)anthracene	<4
Benzo(g,h,i)perylene	<4
1-Methylnaphthalene	76
2-Methylnaphthalene	130

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	01MW90-050119	Client:	Floyd-Snider
Date Received:	05/01/19	Project:	Cantera-TOC, F&BI 905024
Date Extracted:	05/02/19	Lab ID:	905024-18 1/2
Date Analyzed:	05/03/19	Data File:	050314.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	75	31	160
Benzo(a)anthracene-d12	75	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.4
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.04
1-Methylnaphthalene	<0.4
2-Methylnaphthalene	<0.4

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 905024
Date Extracted:	05/02/19	Lab ID:	09-1008 mb
Date Analyzed:	05/03/19	Data File:	050306.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	92	31	160
Benzo(a)anthracene-d12	94	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.2
Acenaphthylene	<0.02
Acenaphthene	<0.02
Fluorene	<0.02
Phenanthrene	<0.02
Anthracene	<0.02
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.02
1-Methylnaphthalene	<0.2
2-Methylnaphthalene	<0.2

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW47-050119	Client:	Floyd-Snider
Date Received:	05/01/19	Project:	Cantera-TOC, F&BI 905024
Date Extracted:	05/06/19	Lab ID:	905024-09
Date Analyzed:	05/07/19	Data File:	050650.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Lower Limit:	Upper Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	102	50	150

Compounds:	Concentration ug/L (ppb)
Hexane	24
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1
Benzene	620 ve
Toluene	5.3
1,2-Dibromoethane (EDB)	<1
Ethylbenzene	24
m,p-Xylene	9.1
o-Xylene	<1
Naphthalene	120

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW47-050119	Client:	Floyd-Snider
Date Received:	05/01/19	Project:	Cantera-TOC, F&BI 905024
Date Extracted:	05/06/19	Lab ID:	905024-09 1/10
Date Analyzed:	05/08/19	Data File:	050828.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration ug/L (ppb)
Hexane	27
Methyl t-butyl ether (MTBE)	<10
1,2-Dichloroethane (EDC)	<10
Benzene	800
Toluene	<10
1,2-Dibromoethane (EDB)	<10
Ethylbenzene	28
m,p-Xylene	<20
o-Xylene	<10
Naphthalene	130

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW90-050119	Client:	Floyd-Snider
Date Received:	05/01/19	Project:	Cantera-TOC, F&BI 905024
Date Extracted:	05/06/19	Lab ID:	905024-18
Date Analyzed:	05/07/19	Data File:	050651.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	102	50	150
4-Bromofluorobenzene	101	50	150

Compounds:	Concentration ug/L (ppb)
Hexane	<1
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1
Benzene	<0.35
Toluene	<1
1,2-Dibromoethane (EDB)	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 905024
Date Extracted:	05/06/19	Lab ID:	09-1018 mb
Date Analyzed:	05/06/19	Data File:	050611.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	94	50	150

Compounds:	Concentration ug/L (ppb)
Hexane	<1
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1
Benzene	<0.35
Toluene	<1
1,2-Dibromoethane (EDB)	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Date of Report: 05/17/19
Date Received: 05/01/19
Project: Cantera-TOC, F&BI 905024

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING METHOD 8021B AND NWTPH-Gx

Laboratory Code: 905024-02 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	490 ve	510 ve	4
Toluene	ug/L (ppb)	6.2	5.9	5
Ethylbenzene	ug/L (ppb)	1.3	1.2	5
Xylenes	ug/L (ppb)	6.3	5.8	8
Gasoline	ug/L (ppb)	2,000	2,100	5

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	91	65-118
Toluene	ug/L (ppb)	50	89	72-122
Ethylbenzene	ug/L (ppb)	50	86	73-126
Xylenes	ug/L (ppb)	150	89	74-118
Gasoline	ug/L (ppb)	1,000	108	69-134

Date of Report: 05/17/19
Date Received: 05/01/19
Project: Cantera-TOC, F&BI 905024

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	99	94	63-142	5

Date of Report: 05/17/19
Date Received: 05/01/19
Project: Cantera-TOC, F&BI 905024

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR SEMIVOLATILE PHENOLS BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 30)
Pentachlorophenol	ug/L (ppb)	2.5	71	88	23-185	21

Date of Report: 05/17/19
Date Received: 05/01/19
Project: Cantera-TOC, F&BI 905024

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	1	71	73	67-116	3
2-Methylnaphthalene	ug/L (ppb)	1	74	74	63-122	0
1-Methylnaphthalene	ug/L (ppb)	1	74	74	65-122	0
Acenaphthylene	ug/L (ppb)	1	74	75	65-119	1
Acenaphthene	ug/L (ppb)	1	77	77	66-118	0
Fluorene	ug/L (ppb)	1	78	79	64-125	1
Phenanthrene	ug/L (ppb)	1	80	80	67-120	0
Anthracene	ug/L (ppb)	1	81	80	65-122	1
Fluoranthene	ug/L (ppb)	1	80	79	65-127	1
Pyrene	ug/L (ppb)	1	72	67	62-130	7
Benz(a)anthracene	ug/L (ppb)	1	83	82	60-118	1
Chrysene	ug/L (ppb)	1	86	83	66-125	4
Benzo(b)fluoranthene	ug/L (ppb)	1	82	76	55-135	8
Benzo(k)fluoranthene	ug/L (ppb)	1	78	79	62-125	1
Benzo(a)pyrene	ug/L (ppb)	1	74	72	58-127	3
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	67	66	36-142	2
Dibenz(a,h)anthracene	ug/L (ppb)	1	61	60	37-133	2
Benzo(g,h,i)perylene	ug/L (ppb)	1	66	66	34-135	0

Date of Report: 05/17/19
Date Received: 05/01/19
Project: Cantera-TOC, F&BI 905024

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 905052-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Hexane	ug/L (ppb)	50	<1	100	44-139
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	89	68-125
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	94	70-119
Benzene	ug/L (ppb)	50	1.3	94	75-114
Toluene	ug/L (ppb)	50	<1	98	73-117
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	<1	104	79-120
Ethylbenzene	ug/L (ppb)	50	<1	97	66-124
m,p-Xylene	ug/L (ppb)	100	<2	99	63-128
o-Xylene	ug/L (ppb)	50	<1	92	64-129
Naphthalene	ug/L (ppb)	50	<1	98	60-145

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Hexane	ug/L (ppb)	50	103	99	51-153	4
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	105	94	70-122	11
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	97	97	78-114	0
Benzene	ug/L (ppb)	50	101	97	75-116	4
Toluene	ug/L (ppb)	50	101	96	79-115	5
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	96	102	82-118	6
Ethylbenzene	ug/L (ppb)	50	100	96	83-111	4
m,p-Xylene	ug/L (ppb)	100	103	99	84-112	4
o-Xylene	ug/L (ppb)	50	103	92	81-117	11
Naphthalene	ug/L (ppb)	50	110	96	72-131	14

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

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Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 905024
Work Order Number: 1905046

May 15, 2019

Attention Michael Erdahl:

Fremont Analytical, Inc. received 2 sample(s) on 5/2/2019 for the analyses presented in the following report.

Extractable Petroleum Hydrocarbons by NWEPH
Volatile Petroleum Hydrocarbons by NWVPH

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

Date: *05/15/2019*

CLIENT: Friedman & Bruya
Project: 905024
Work Order: 1905046

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1905046-001	01MW47-050119	05/01/2019 10:39 AM	05/02/2019 11:21 AM
1905046-002	01MW90-050119	05/01/2019 4:36 PM	05/02/2019 11:21 AM

Case Narrative

WO#: **1905046**
Date: **5/15/2019**

CLIENT: Friedman & Bruya
Project: 905024

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **1905046**
Date Reported: **5/15/2019**

Client: Friedman & Bruya
Collection Date: 5/1/2019 10:39:00 AM
Project: 905024
Lab ID: 1905046-001
Matrix:
Client Sample ID: 01MW47-050119

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 24488		Analyst: DW
Aliphatic Hydrocarbon (C10-C12)	306	20.6	*	µg/L	1	5/15/2019 7:46:00 AM
Aliphatic Hydrocarbon (C12-C16)	327	20.6		µg/L	1	5/15/2019 7:46:00 AM
Aliphatic Hydrocarbon (C16-C21)	63.6	20.6		µg/L	1	5/15/2019 7:46:00 AM
Aliphatic Hydrocarbon (C21-C34)	ND	20.6		µg/L	1	5/15/2019 7:46:00 AM
Aliphatic Hydrocarbon (C8-C10)	42.4	41.3	*	µg/L	1	5/15/2019 7:46:00 AM
Aromatic Hydrocarbon (C10-C12)	316	20.6		µg/L	1	5/14/2019 11:01:00 PM
Aromatic Hydrocarbon (C12-C16)	1,090	20.6		µg/L	1	5/14/2019 11:01:00 PM
Aromatic Hydrocarbon (C16-C21)	442	20.6		µg/L	1	5/14/2019 11:01:00 PM
Aromatic Hydrocarbon (C21-C34)	547	20.6		µg/L	1	5/14/2019 11:01:00 PM
Aromatic Hydrocarbon (C8-C10)	199	20.6	*	µg/L	1	5/14/2019 11:01:00 PM
Surr: 1-Chlorooctadecane	79.8	60 - 140		%Rec	1	5/15/2019 7:46:00 AM
Surr: o-Terphenyl	74.7	60 - 140		%Rec	1	5/14/2019 11:01:00 PM

NOTES:
* - Flagged value is not within established control limits.

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 24485		Analyst: CR
Aliphatic Hydrocarbon (C5-C6)	687	40.0		µg/L	1	5/9/2019 10:59:24 AM
Aliphatic Hydrocarbon (C6-C8)	719	20.0		µg/L	1	5/9/2019 10:59:24 AM
Aliphatic Hydrocarbon (C8-C10)	185	20.0		µg/L	1	5/9/2019 10:59:24 AM
Aliphatic Hydrocarbon (C10-C12)	357	20.0		µg/L	1	5/9/2019 10:59:24 AM
Aromatic Hydrocarbon (C8-C10)	413	50.0		µg/L	1	5/9/2019 10:59:24 AM
Aromatic Hydrocarbon (C10-C12)	894	20.0		µg/L	1	5/9/2019 10:59:24 AM
Aromatic Hydrocarbon (C12-C13)	1,570	200	D	µg/L	10	5/9/2019 6:52:17 AM
Benzene	842	20.0		µg/L	1	5/9/2019 10:59:24 AM
Toluene	ND	20.0		µg/L	1	5/9/2019 10:59:24 AM
Ethylbenzene	31.0	20.0		µg/L	1	5/9/2019 10:59:24 AM
m,p-Xylene	ND	40.0		µg/L	1	5/9/2019 10:59:24 AM
o-Xylene	ND	20.0		µg/L	1	5/9/2019 10:59:24 AM
Naphthalene	152	20.0		µg/L	1	5/9/2019 10:59:24 AM
Methyl tert-butyl ether (MTBE)	ND	20.0		µg/L	1	5/9/2019 10:59:24 AM
Surr: 1,4-Difluorobenzene	111	65 - 140		%Rec	1	5/9/2019 10:59:24 AM
Surr: Bromofluorobenzene	104	65 - 140		%Rec	1	5/9/2019 10:59:24 AM

Analytical Report

Work Order: **1905046**
Date Reported: **5/15/2019**

Client: Friedman & Bruya
Collection Date: 5/1/2019 4:36:00 PM
Project: 905024
Lab ID: 1905046-002
Matrix:
Client Sample ID: 01MW90-050119

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 24488		Analyst: DW
Aliphatic Hydrocarbon (C10-C12)	ND	22.3	*	µg/L	1	5/15/2019 8:30:00 AM
Aliphatic Hydrocarbon (C12-C16)	73.3	22.3		µg/L	1	5/15/2019 8:30:00 AM
Aliphatic Hydrocarbon (C16-C21)	ND	22.3		µg/L	1	5/15/2019 8:30:00 AM
Aliphatic Hydrocarbon (C21-C34)	ND	22.3		µg/L	1	5/15/2019 8:30:00 AM
Aliphatic Hydrocarbon (C8-C10)	ND	44.6	*	µg/L	1	5/15/2019 8:30:00 AM
Aromatic Hydrocarbon (C10-C12)	ND	22.3		µg/L	1	5/14/2019 11:45:00 PM
Aromatic Hydrocarbon (C12-C16)	55.0	22.3		µg/L	1	5/14/2019 11:45:00 PM
Aromatic Hydrocarbon (C16-C21)	ND	22.3		µg/L	1	5/14/2019 11:45:00 PM
Aromatic Hydrocarbon (C21-C34)	ND	22.3		µg/L	1	5/14/2019 11:45:00 PM
Aromatic Hydrocarbon (C8-C10)	ND	22.3	*	µg/L	1	5/14/2019 11:45:00 PM
Surr: 1-Chlorooctadecane	86.8	60 - 140		%Rec	1	5/15/2019 8:30:00 AM
Surr: o-Terphenyl	69.1	60 - 140		%Rec	1	5/14/2019 11:45:00 PM

NOTES:
* - Flagged value is not within established control limits.

Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 24485		Analyst: CR
Aliphatic Hydrocarbon (C5-C6)	ND	40.0		µg/L	1	5/9/2019 7:33:26 AM
Aliphatic Hydrocarbon (C6-C8)	ND	20.0		µg/L	1	5/9/2019 7:33:26 AM
Aliphatic Hydrocarbon (C8-C10)	ND	20.0		µg/L	1	5/9/2019 7:33:26 AM
Aliphatic Hydrocarbon (C10-C12)	ND	20.0		µg/L	1	5/9/2019 7:33:26 AM
Aromatic Hydrocarbon (C8-C10)	ND	50.0		µg/L	1	5/9/2019 7:33:26 AM
Aromatic Hydrocarbon (C10-C12)	ND	20.0		µg/L	1	5/9/2019 7:33:26 AM
Aromatic Hydrocarbon (C12-C13)	ND	20.0		µg/L	1	5/9/2019 7:33:26 AM
Benzene	ND	20.0		µg/L	1	5/9/2019 7:33:26 AM
Toluene	ND	20.0		µg/L	1	5/9/2019 7:33:26 AM
Ethylbenzene	ND	20.0		µg/L	1	5/9/2019 7:33:26 AM
m,p-Xylene	ND	40.0		µg/L	1	5/9/2019 7:33:26 AM
o-Xylene	ND	20.0		µg/L	1	5/9/2019 7:33:26 AM
Naphthalene	ND	20.0		µg/L	1	5/9/2019 7:33:26 AM
Methyl tert-butyl ether (MTBE)	ND	20.0		µg/L	1	5/9/2019 7:33:26 AM
Surr: 1,4-Difluorobenzene	97.9	65 - 140		%Rec	1	5/9/2019 7:33:26 AM
Surr: Bromofluorobenzene	104	65 - 140		%Rec	1	5/9/2019 7:33:26 AM

Work Order: 1905046
CLIENT: Friedman & Bruya
Project: 905024

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **MB-24488** SampType: **MBLK** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **MBLKW** Batch ID: **24488** Analysis Date: **5/14/2019** SeqNo: **1013513**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	ND	20.1		0	0						
Aromatic Hydrocarbon (C12-C16)	ND	20.1		0	0						
Aromatic Hydrocarbon (C16-C21)	ND	20.1		0	0						
Aromatic Hydrocarbon (C21-C34)	ND	20.1		0	0						
Aromatic Hydrocarbon (C8-C10)	ND	20.1		0	0						*
Surr: o-Terphenyl	1,420		2,010		70.7	60	140				

NOTES:
* - Flagged value is not within established control limits.

Sample ID: **LCS-24488** SampType: **LCS** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW** Batch ID: **24488** Analysis Date: **5/14/2019** SeqNo: **1013510**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	1,770	19.9	2,489	0	70.9	70	130				
Aromatic Hydrocarbon (C12-C16)	1,960	19.9	2,489	0	78.7	70	130				
Aromatic Hydrocarbon (C16-C21)	2,160	19.9	2,489	0	86.7	70	130				
Aromatic Hydrocarbon (C21-C34)	2,320	19.9	2,489	0	93.1	70	130				
Aromatic Hydrocarbon (C8-C10)	1,460	19.9	2,489	0	58.8	70	130				S
Surr: o-Terphenyl	1,450		1,991		72.8	60	140				

NOTES:
S - Outlying spike recovery observed (low bias). Samples will be qualified with a *.

Sample ID: **LCSD-24488** SampType: **LCSD** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW02** Batch ID: **24488** Analysis Date: **5/14/2019** SeqNo: **1013511**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	1,820	20.0	2,504	0	72.6	70	130	1,766	2.95	20	
Aromatic Hydrocarbon (C12-C16)	2,130	20.0	2,504	0	84.9	70	130	1,959	8.25	20	
Aromatic Hydrocarbon (C16-C21)	2,210	20.0	2,504	0	88.1	70	130	2,157	2.29	20	
Aromatic Hydrocarbon (C21-C34)	2,270	20.0	2,504	0	90.7	70	130	2,317	2.00	20	
Aromatic Hydrocarbon (C8-C10)	1,480	20.0	2,504	0	59.1	70	130	1,464	1.05	20	S
Surr: o-Terphenyl	1,540		2,003		77.0	60	140		0		

Work Order: 1905046
CLIENT: Friedman & Bruya
Project: 905024

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **LCSD-24488** SampType: **LCSD** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW02** Batch ID: **24488** Analysis Date: **5/14/2019** SeqNo: **1013511**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

NOTES:
S - Outlying spike recovery observed (low bias). Samples will be qualified with a *.

Sample ID: **MB-24488** SampType: **MBLK** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **MBLKW** Batch ID: **24488** Analysis Date: **5/15/2019** SeqNo: **1013559**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	ND	20.1		0	0						*
Aliphatic Hydrocarbon (C12-C16)	ND	20.1		0	0						
Aliphatic Hydrocarbon (C16-C21)	ND	20.1		0	0						
Aliphatic Hydrocarbon (C21-C34)	ND	20.1		0	0						
Aliphatic Hydrocarbon (C8-C10)	ND	40.2		0	0						*
Surr: 1-Chlorooctadecane	1,510		2,010		75.1	60	140				

NOTES:
* - Flagged value is not within established control limits.

Sample ID: **LCS-24488** SampType: **LCS** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW** Batch ID: **24488** Analysis Date: **5/15/2019** SeqNo: **1013557**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	1,520	19.9	2,489	0	60.9	70	130				S
Aliphatic Hydrocarbon (C12-C16)	1,880	19.9	2,489	0	75.7	70	130				
Aliphatic Hydrocarbon (C16-C21)	2,050	19.9	2,489	0	82.2	70	130				
Aliphatic Hydrocarbon (C21-C34)	4,050	19.9	4,979	0	81.3	70	130				
Aliphatic Hydrocarbon (C8-C10)	785	39.8	2,489	0	31.5	70	130				S
Surr: 1-Chlorooctadecane	1,590		1,991		80.0	60	140				

NOTES:
S - Outlying spike recovery observed (Aliphatic Hydrocarbon (C8-C10) and (C10-C12); low bias). Samples will be qualified with a *.

Work Order: 1905046
CLIENT: Friedman & Bruya
Project: 905024

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **LCSD-24488** SampType: **LCSD** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW02** Batch ID: **24488** Analysis Date: **5/15/2019** SeqNo: **1013558**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	1,540	20.0	5,008	0	30.8	70	130	1,516	1.73	20	S
Aliphatic Hydrocarbon (C12-C16)	1,550	20.0	5,008	0	30.9	70	130	1,885	19.7	20	S
Aliphatic Hydrocarbon (C16-C21)	1,980	20.0	5,008	0	39.6	70	130	2,047	3.15	20	S
Aliphatic Hydrocarbon (C21-C34)	3,450	20.0	5,008	0	68.9	70	130	4,048	15.9	20	S
Aliphatic Hydrocarbon (C8-C10)	735	40.1	10,020	0	7.34	70	130	784.9	6.52	20	S
Surr: 1-Chlorooctadecane	1,400		2,003		69.8	60	140		0		

NOTES:

S - Outlying spike recovery(ies) observed. A duplicate analysis was performed and recovered within range (Aliphatic Hydrocarbon (C12-C16), (C16-C21), and (C21-C34)).

S - Outlying spike recovery observed (Aliphatic Hydrocarbon (C8-C10) and (C10-C12); low bias). Samples will be qualified with a *.

Work Order: 1905046
CLIENT: Friedman & Bruya
Project: 905024

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **LCS-24485** SampType: **LCS** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51316**
Client ID: **LCSW** Batch ID: **24485** Analysis Date: **5/9/2019** SeqNo: **1010081**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	582	40.0	600.0	0	97.1	70	130				
Aliphatic Hydrocarbon (C6-C8)	208	20.0	200.0	0	104	70	130				
Aliphatic Hydrocarbon (C8-C10)	192	20.0	200.0	0	96.1	70	130				
Aliphatic Hydrocarbon (C10-C12)	201	20.0	200.0	0	101	70	130				
Aromatic Hydrocarbon (C8-C10)	786	50.0	800.0	0	98.3	70	130				
Aromatic Hydrocarbon (C10-C12)	194	20.0	200.0	0	96.9	70	130				
Aromatic Hydrocarbon (C12-C13)	213	20.0	200.0	0	106	70	130				
Benzene	196	20.0	200.0	0	97.9	70	130				
Toluene	196	20.0	200.0	0	97.9	70	130				
Ethylbenzene	194	20.0	200.0	0	97.2	70	130				
m,p-Xylene	393	40.0	400.0	0	98.2	70	130				
o-Xylene	197	20.0	200.0	0	98.5	70	130				
Naphthalene	208	20.0	200.0	0	104	70	130				
Methyl tert-butyl ether (MTBE)	208	20.0	200.0	0	104	70	130				
Surr: 1,4-Difluorobenzene	51.8		50.00		104	65	140				
Surr: Bromofluorobenzene	53.0		50.00		106	65	140				

Sample ID: **LCSD-24485** SampType: **LCSD** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51316**
Client ID: **LCSW02** Batch ID: **24485** Analysis Date: **5/9/2019** SeqNo: **1010082**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	611	40.0	600.0	0	102	70	130	582.5	4.75	20	
Aliphatic Hydrocarbon (C6-C8)	198	20.0	200.0	0	99.1	70	130	207.6	4.69	20	
Aliphatic Hydrocarbon (C8-C10)	189	20.0	200.0	0	94.7	70	130	192.1	1.43	20	
Aliphatic Hydrocarbon (C10-C12)	207	20.0	200.0	0	104	70	130	201.1	3.10	20	
Aromatic Hydrocarbon (C8-C10)	813	50.0	800.0	0	102	70	130	786.3	3.28	20	
Aromatic Hydrocarbon (C10-C12)	197	20.0	200.0	0	98.6	70	130	193.8	1.74	20	
Aromatic Hydrocarbon (C12-C13)	196	20.0	200.0	0	98.0	70	130	212.7	8.14	20	
Benzene	202	20.0	200.0	0	101	70	130	195.9	3.01	20	
Toluene	202	20.0	200.0	0	101	70	130	195.8	3.14	20	

Work Order: 1905046
CLIENT: Friedman & Bruya
Project: 905024

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **LCSD-24485** SampType: **LCSD** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51316**
Client ID: **LCSW02** Batch ID: **24485** Analysis Date: **5/9/2019** SeqNo: **1010082**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethylbenzene	202	20.0	200.0	0	101	70	130	194.4	3.78	20	
m,p-Xylene	408	40.0	400.0	0	102	70	130	392.9	3.79	20	
o-Xylene	203	20.0	200.0	0	102	70	130	197.0	3.13	20	
Naphthalene	213	20.0	200.0	0	106	70	130	208.3	2.10	20	
Methyl tert-butyl ether (MTBE)	207	20.0	200.0	0	104	70	130	207.5	0.181	20	
Surr: 1,4-Difluorobenzene	51.0		50.00		102	65	140		0		
Surr: Bromofluorobenzene	51.8		50.00		104	65	140		0		

Sample ID: **MB-24485** SampType: **MBLK** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51316**
Client ID: **MBLKW** Batch ID: **24485** Analysis Date: **5/9/2019** SeqNo: **1010083**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	ND	40.0		0	0						
Aliphatic Hydrocarbon (C6-C8)	ND	20.0		0	0						
Aliphatic Hydrocarbon (C8-C10)	ND	20.0		0	0						
Aliphatic Hydrocarbon (C10-C12)	ND	20.0		0	0						
Aromatic Hydrocarbon (C8-C10)	ND	50.0		0	0						
Aromatic Hydrocarbon (C10-C12)	ND	20.0		0	0						
Aromatic Hydrocarbon (C12-C13)	ND	20.0		0	0						
Benzene	ND	20.0		0	0						
Toluene	ND	20.0		0	0						
Ethylbenzene	ND	20.0		0	0						
m,p-Xylene	ND	40.0		0	0						
o-Xylene	ND	20.0		0	0						
Naphthalene	ND	20.0		0	0						
Methyl tert-butyl ether (MTBE)	ND	20.0		0	0						
Surr: 1,4-Difluorobenzene	48.5		50.00		97.0	65	140				
Surr: Bromofluorobenzene	50.9		50.00		102	65	140				

Work Order: 1905046
CLIENT: Friedman & Bruya
Project: 905024

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **1905058-001BDUP** SampType: **DUP** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51316**
Client ID: **BATCH** Batch ID: **24485** Analysis Date: **5/9/2019** SeqNo: **1010077**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	93.4	40.0		0	0			89.20	4.64	25	
Aliphatic Hydrocarbon (C6-C8)	ND	20.0		0	0			0		25	
Aliphatic Hydrocarbon (C8-C10)	ND	20.0		0	0			0		25	
Aliphatic Hydrocarbon (C10-C12)	ND	20.0		0	0			0		25	
Aromatic Hydrocarbon (C8-C10)	ND	50.0		0	0			0		25	
Aromatic Hydrocarbon (C10-C12)	ND	20.0		0	0			0		25	
Aromatic Hydrocarbon (C12-C13)	ND	20.0		0	0			0		25	
Benzene	ND	20.0		0	0			0		25	
Toluene	ND	20.0		0	0			0		25	
Ethylbenzene	ND	20.0		0	0			0		25	
m,p-Xylene	ND	40.0		0	0			0		25	
o-Xylene	ND	20.0		0	0			0		25	
Naphthalene	ND	20.0		0	0			0		25	
Methyl tert-butyl ether (MTBE)	ND	20.0		0	0			0		25	
Surr: 1,4-Difluorobenzene	50.1		50.00		100	65	140		0		
Surr: Bromofluorobenzene	52.1		50.00		104	65	140		0		

Sample Log-In Check List

Client Name:	**FB**	Work Order Number:	**1905046**
Logged by:	**Mike Ridgeway**	Date Received:	**5/2/2019 11:21:00 AM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☑	Not Required ☐
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes ☑	No ☐	NA ☐
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☑	NA ☐
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified:		Date:	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

19. Additional remarks:

Item Information

Item #	Temp ºC
Cooler	4.3
Sample	5.1

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

Page # 1 of 1

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 Fax # (206) 283-5044

SUBCONTRACTER Fremont

PROJECT NAME/NO. 905024

PO # B-252

REMARKS Flood Smoke Deliverables
Please Email Results

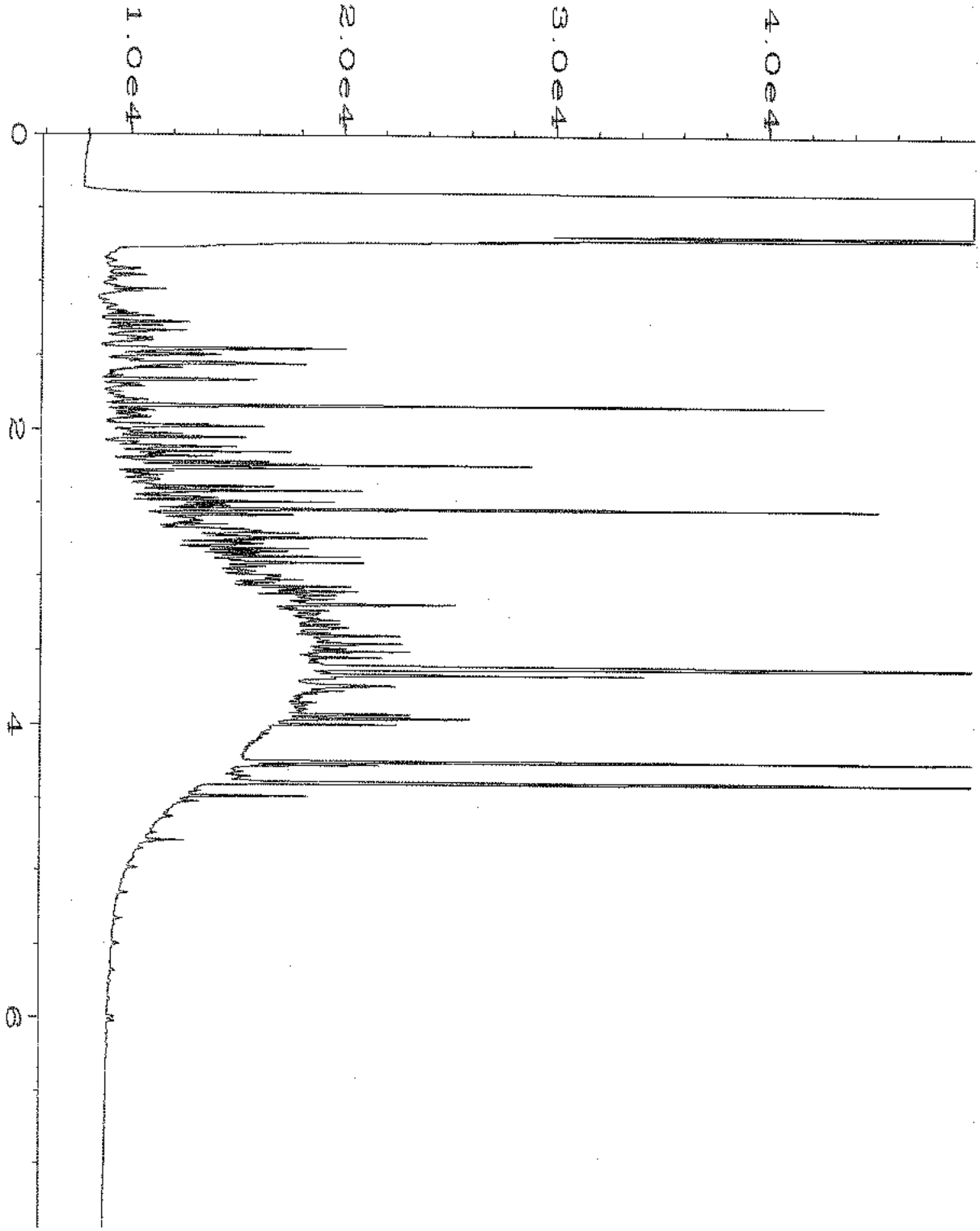
TURNAROUND TIME
☐ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: Dioxins/Furans	EPH	VPH								Notes
01MW47-050119		5/1/19	1039	H_2O			X	X								
01MW90-050119		5/1/19	1636	↓			X	X								

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	5/2/19	10:12 AM
Received by:		Phoebe Autio	FAI	5/2/19	11:21 AM
Relinquished by:					
Received by:					



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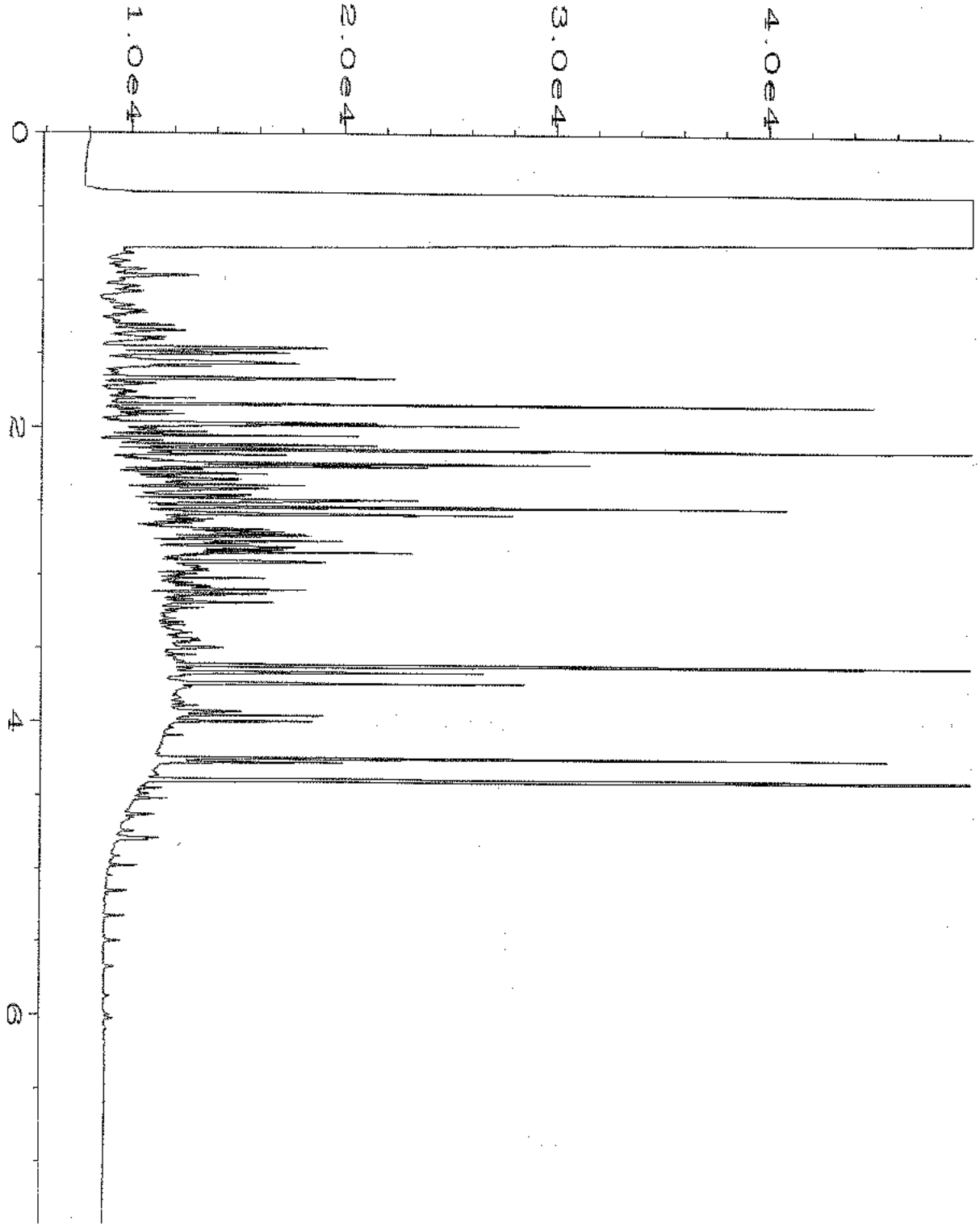
Report Created on	: 09 May 19 10:21 AM	Analysis Method	: DX.MTH



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Instrument	: GC1	Vial Number	: 14
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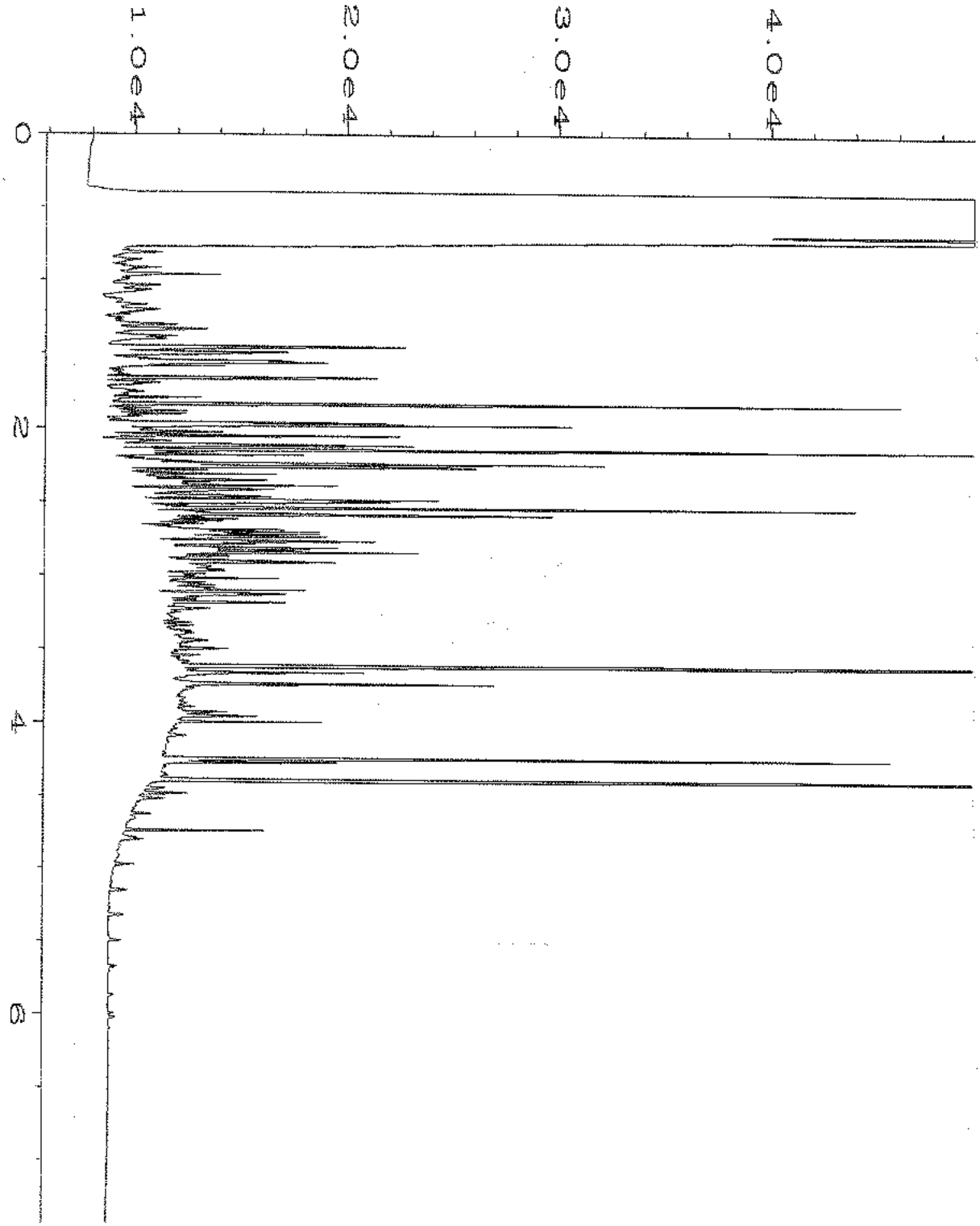

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Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 15
Sample Name	: 905024-03	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 12
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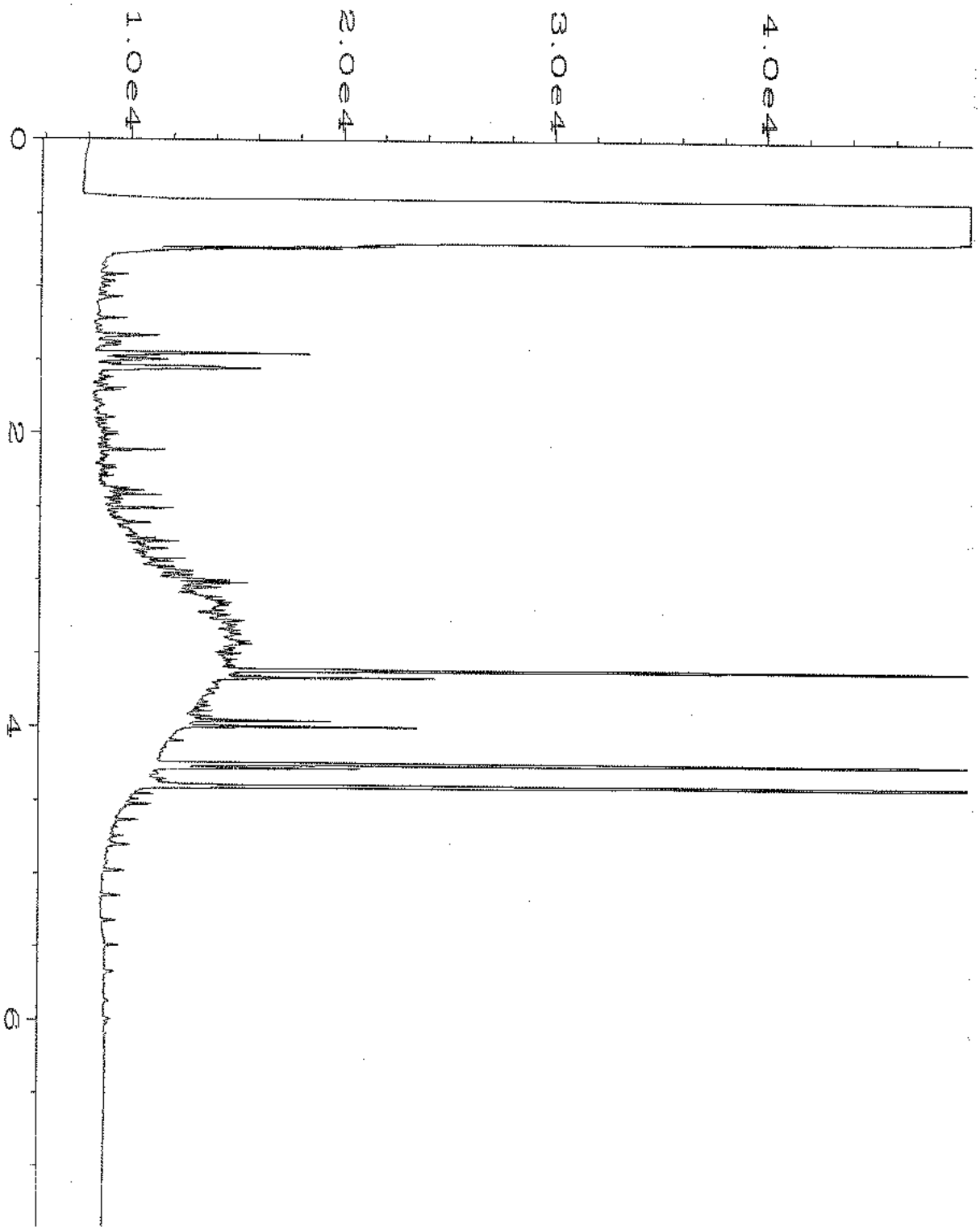
Report Created on	: 09 May 19 10:19 AM	Analysis Method	: DX.MTH



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Sample Name	: 905024-04	Injection Number	: 1
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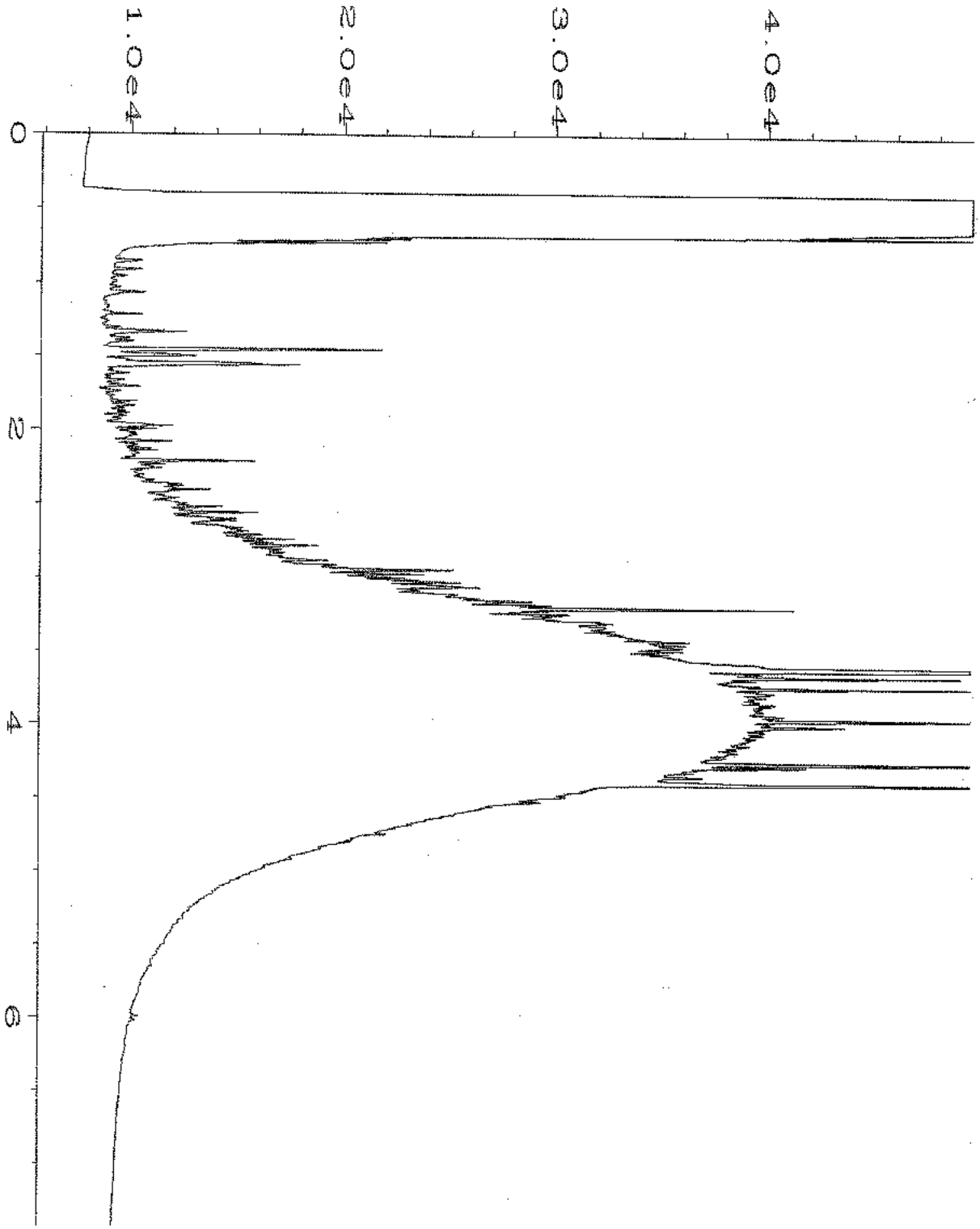

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Sample Name	: 905024-05	Injection Number	: 1
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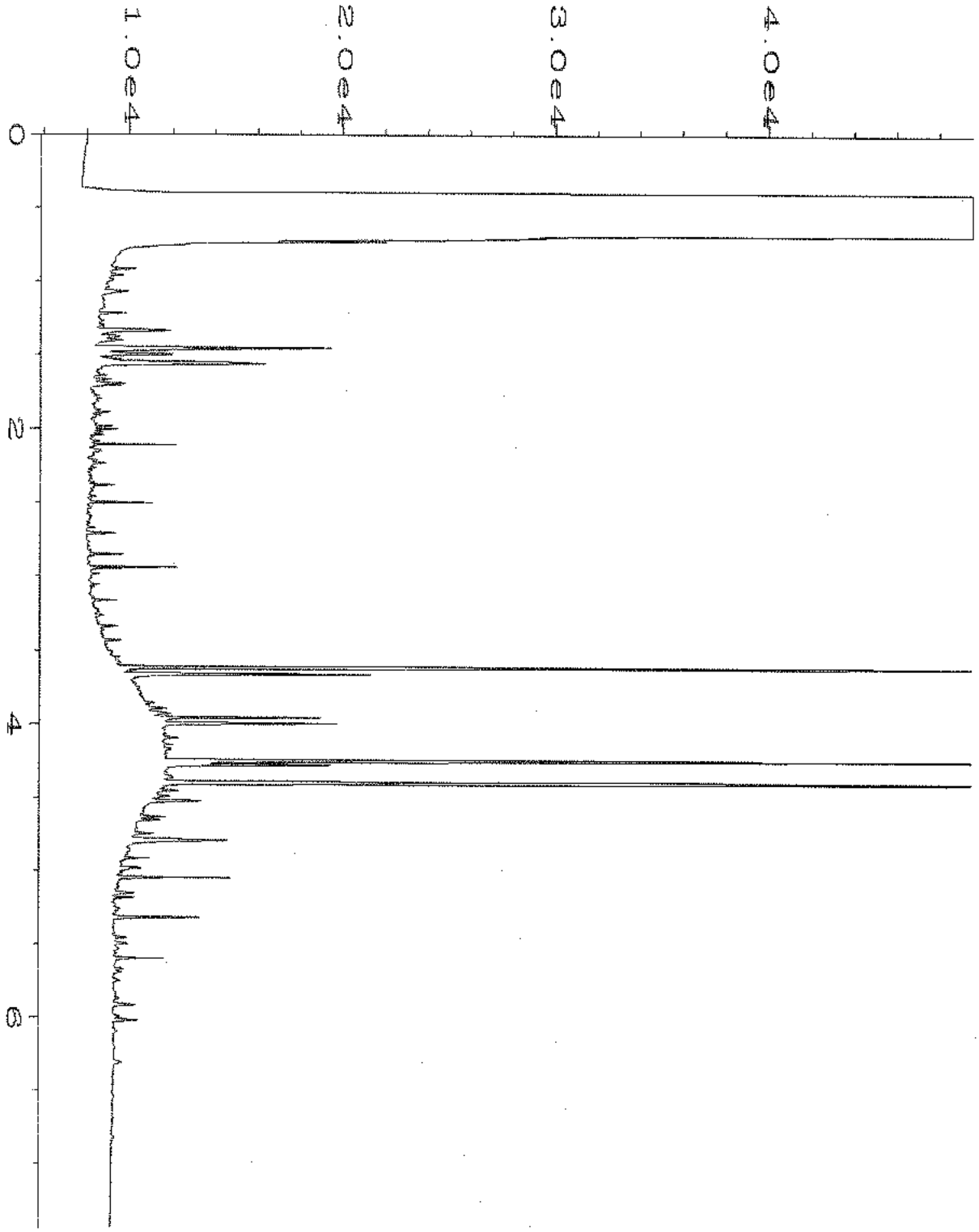

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Instrument : GC1
Sample Name : 905024-06
Run Time Bar Code:
Acquired on : 08 May 19 04:43 PM
Report Created on: 09 May 19 10:23 AM

Page Number : 1
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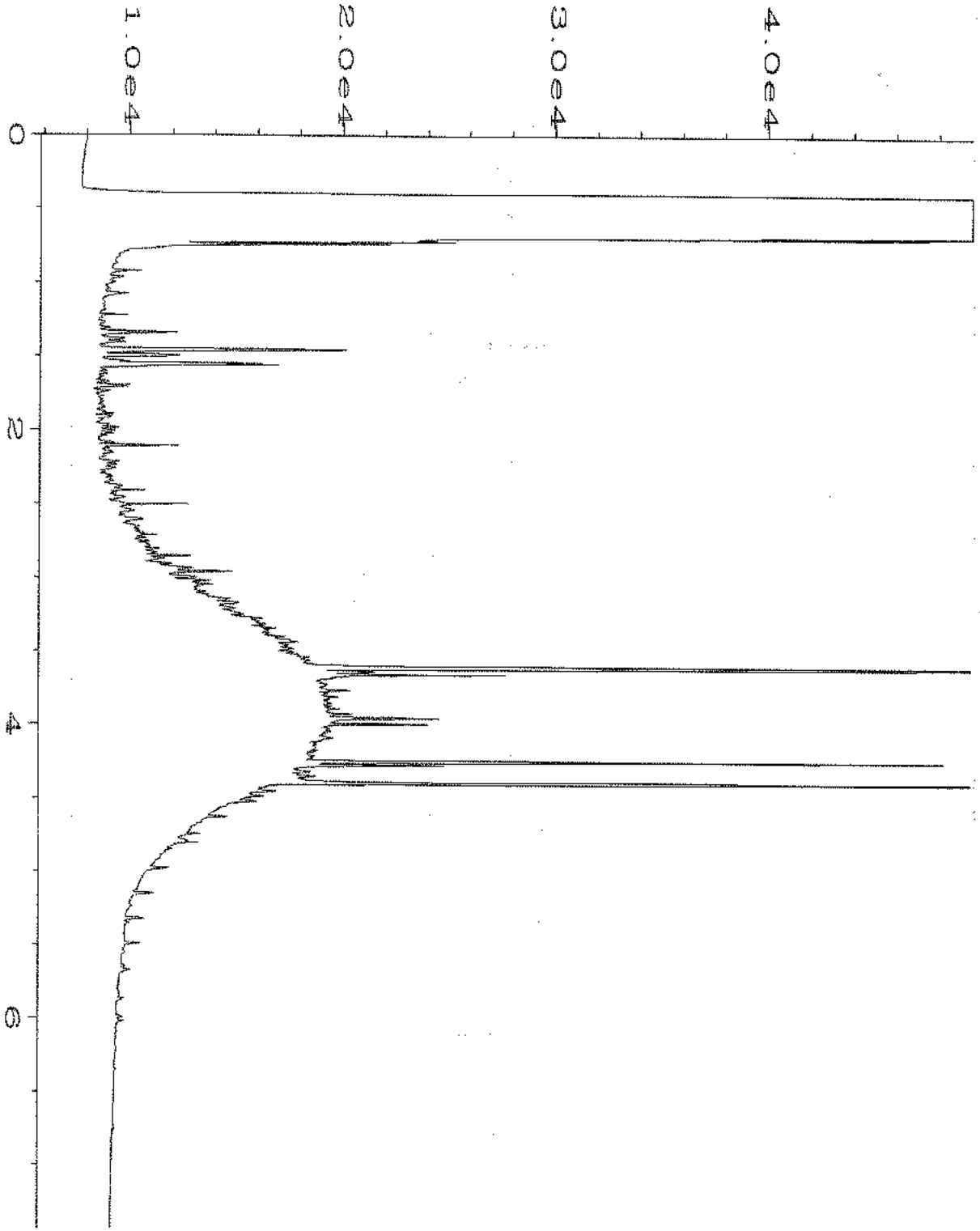
Injection Number : 1
Sequence Line : 12
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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Operator	: TL	Page Number	: 1
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Sample Name	: 905024-07	Injection Number	: 1
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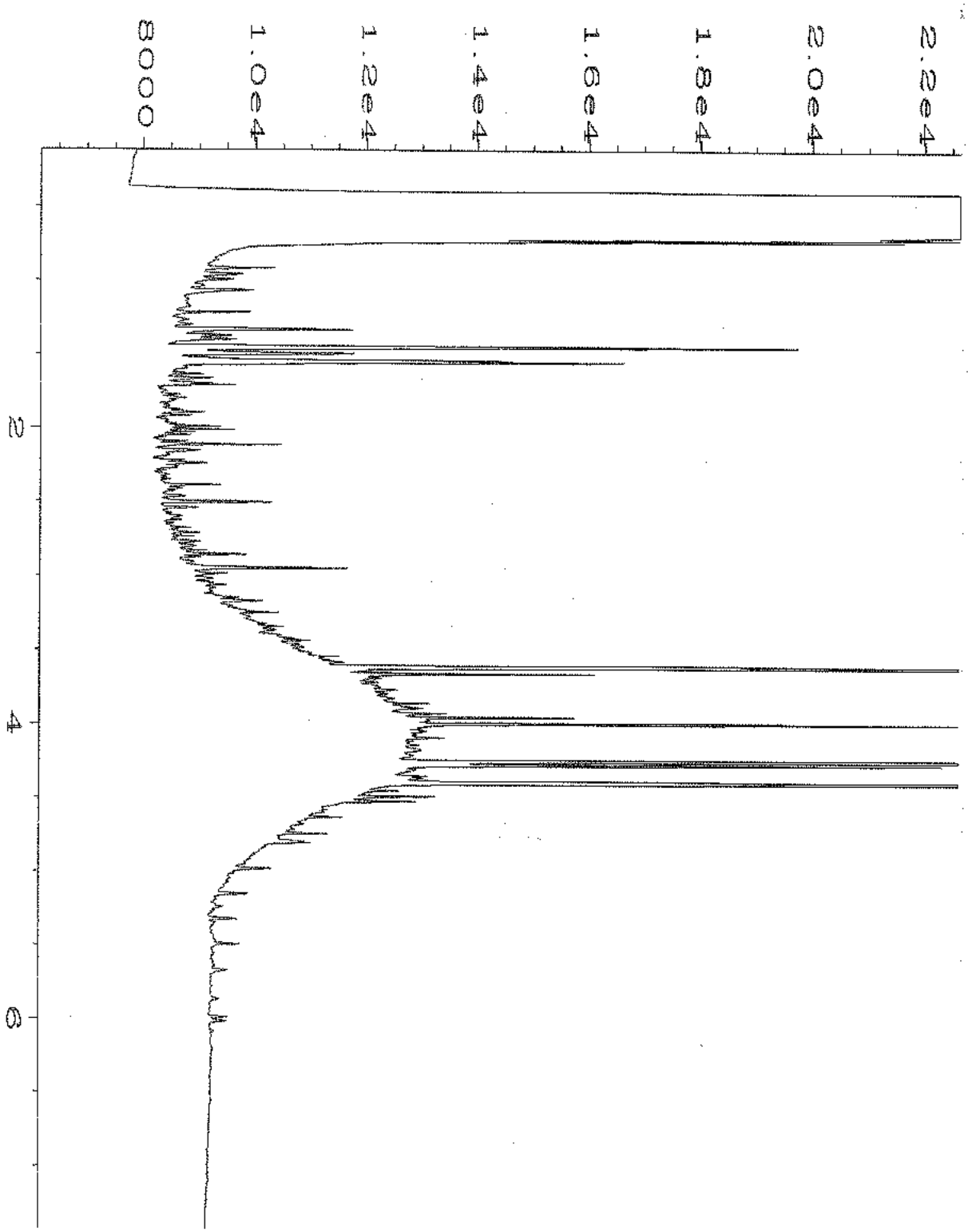

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Instrument : GC1
Sample Name : 905024-08
Run Time Bar Code:
Acquired on : 08 May 19 05:06 PM
Report Created on: 09 May 19 10:24 AM

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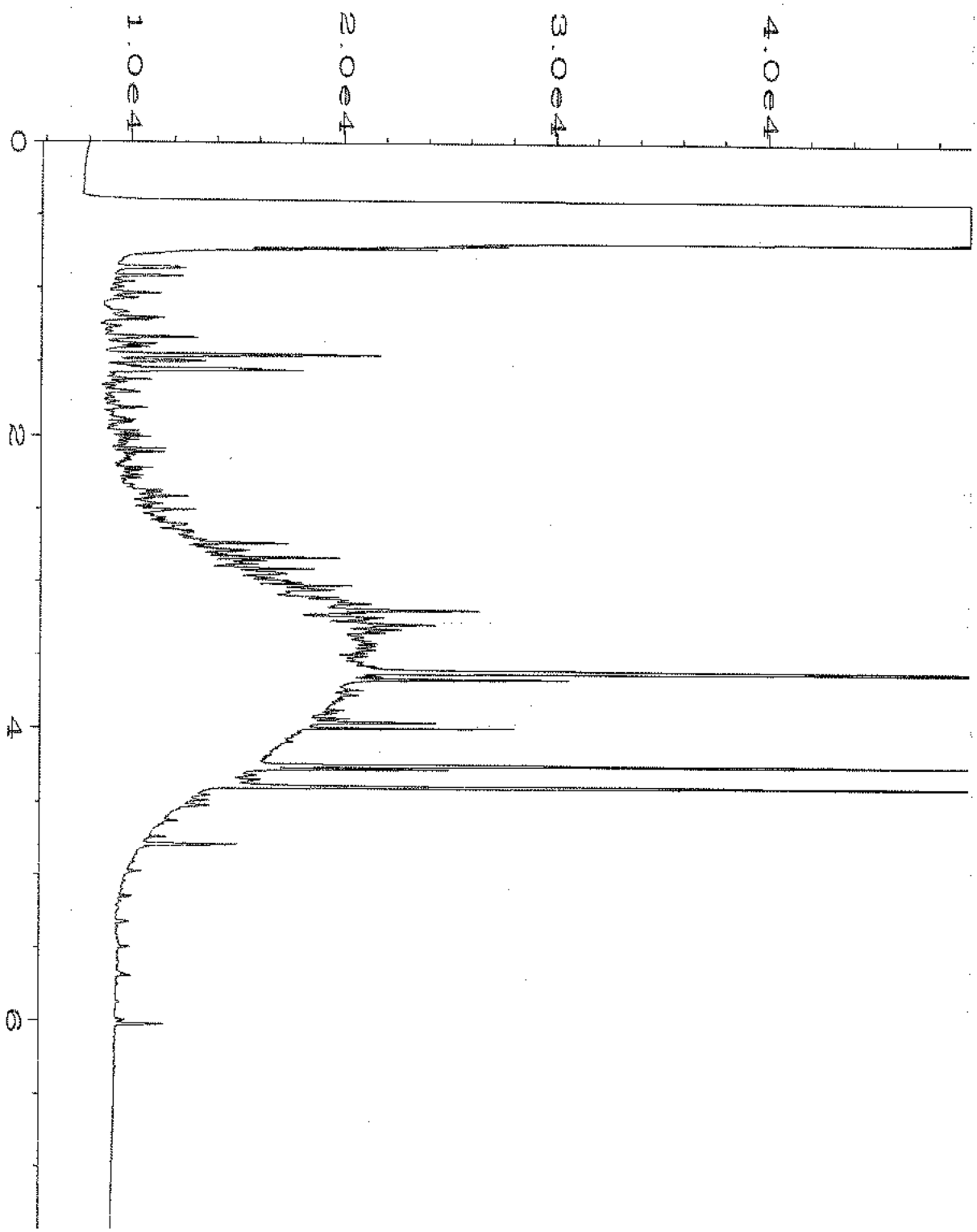
Analysis Method : DX.MTH



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Instrument	: GC1	Vial Number	: 21
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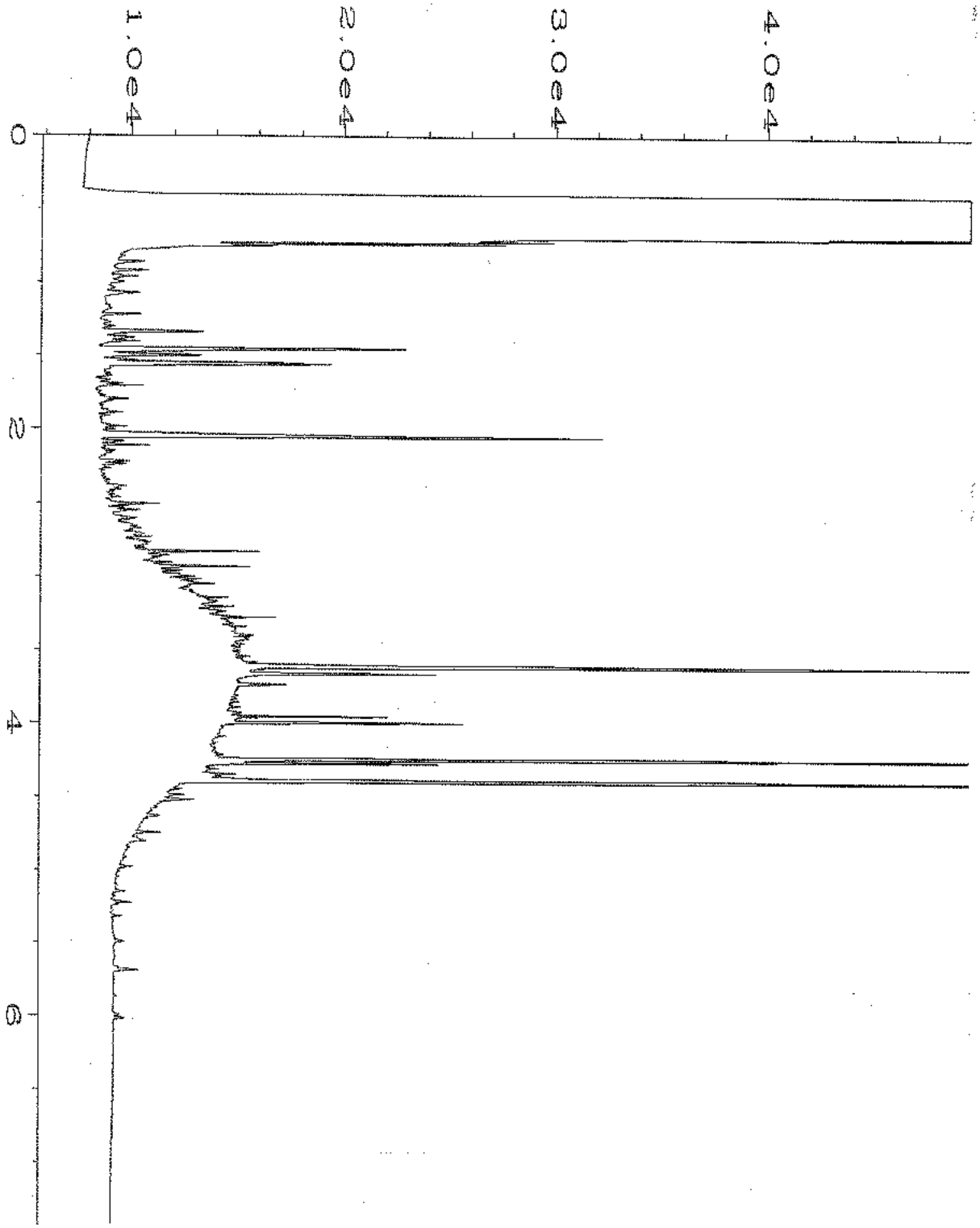
Report Created on	: 09 May 19 10:24 AM	Analysis Method	: DX.MTH



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Instrument	: GC1	Vial Number	: 22
Sample Name	: 905024-11	Injection Number	: 1
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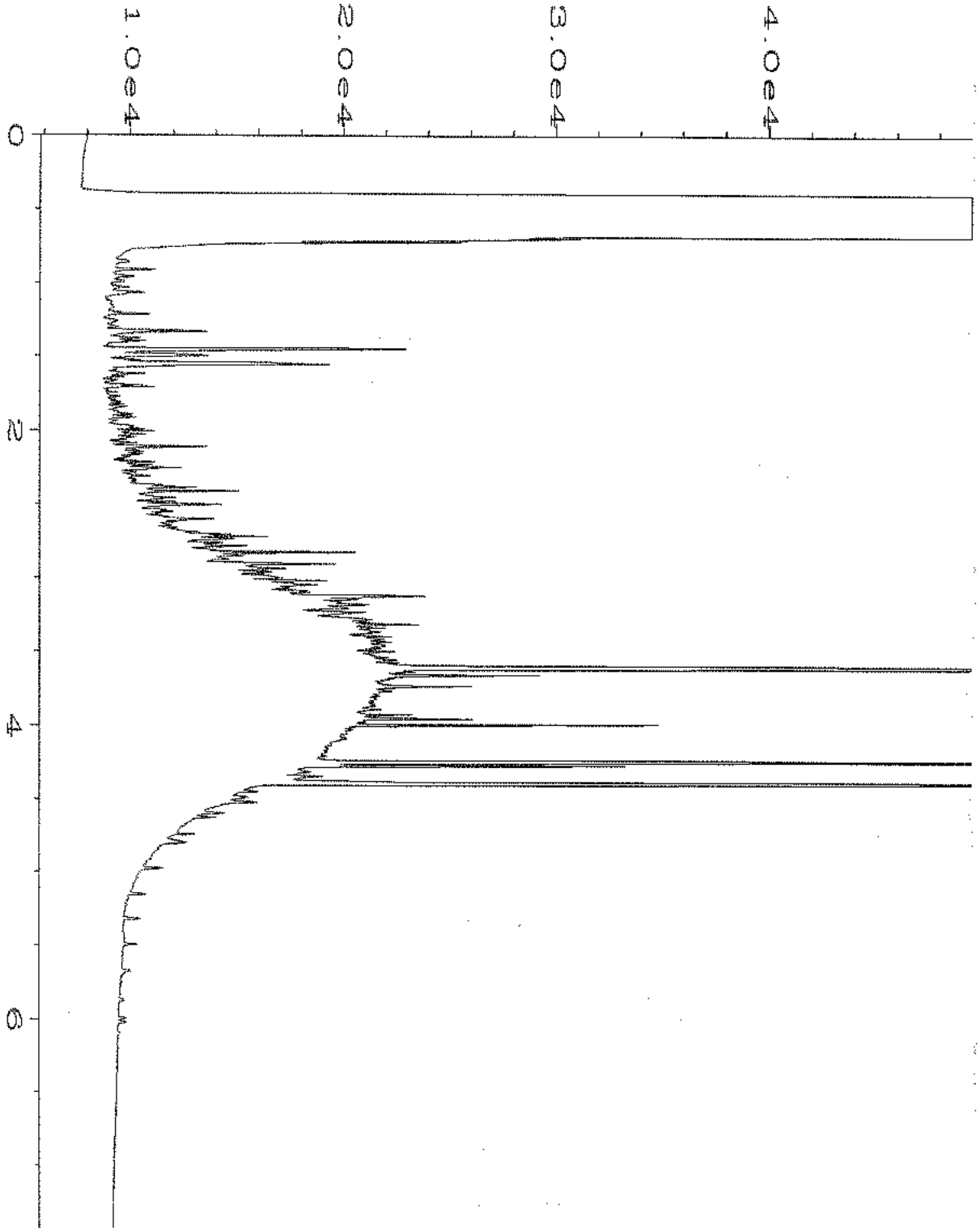

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Instrument : GC1
Sample Name : 905024-12
Run Time Bar Code:
Acquired on : 08 May 19 05:41 PM
Report Created on: 09 May 19 10:25 AM

Page Number : 1
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Injection Number : 1
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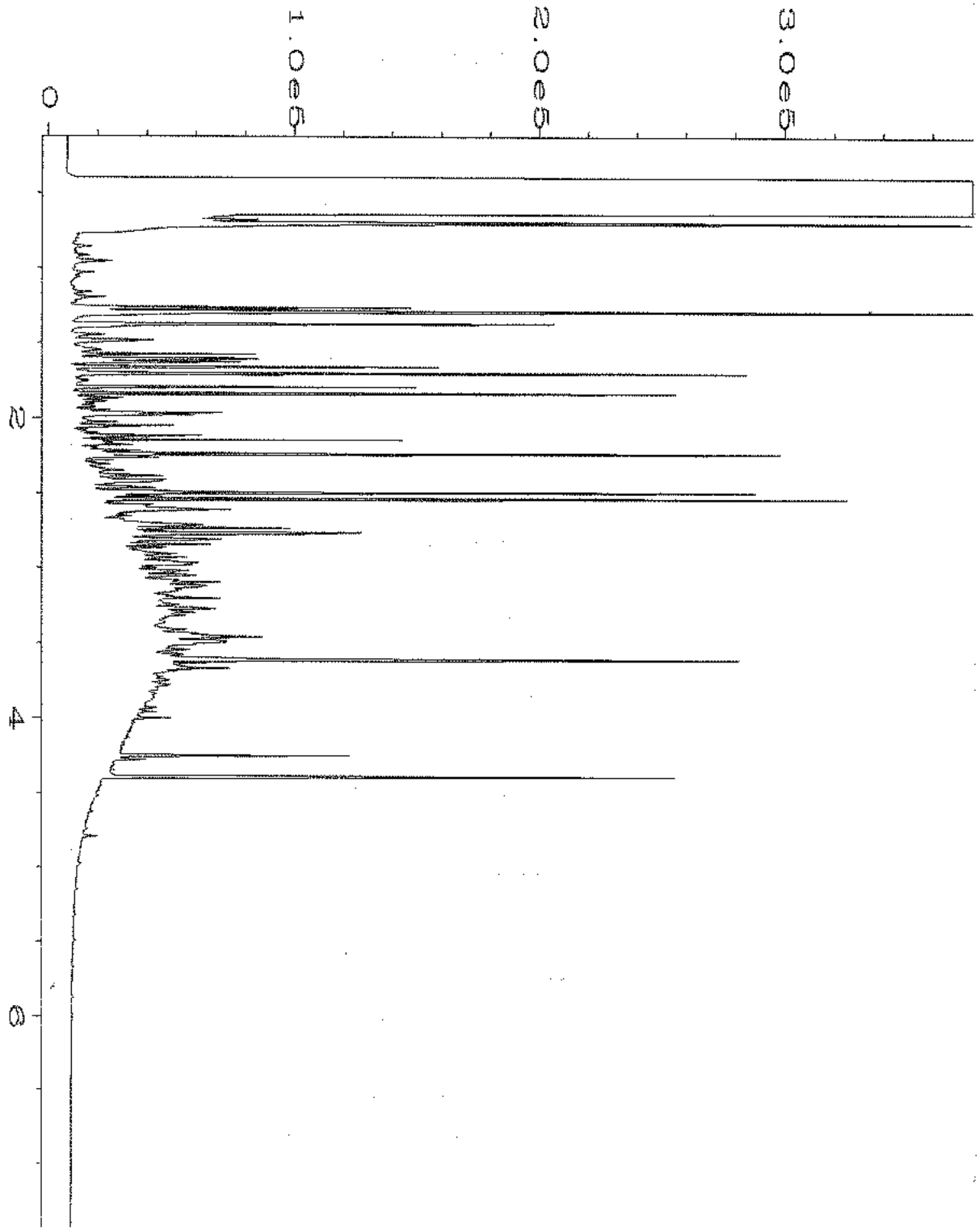
Analysis Method : DX.MTH



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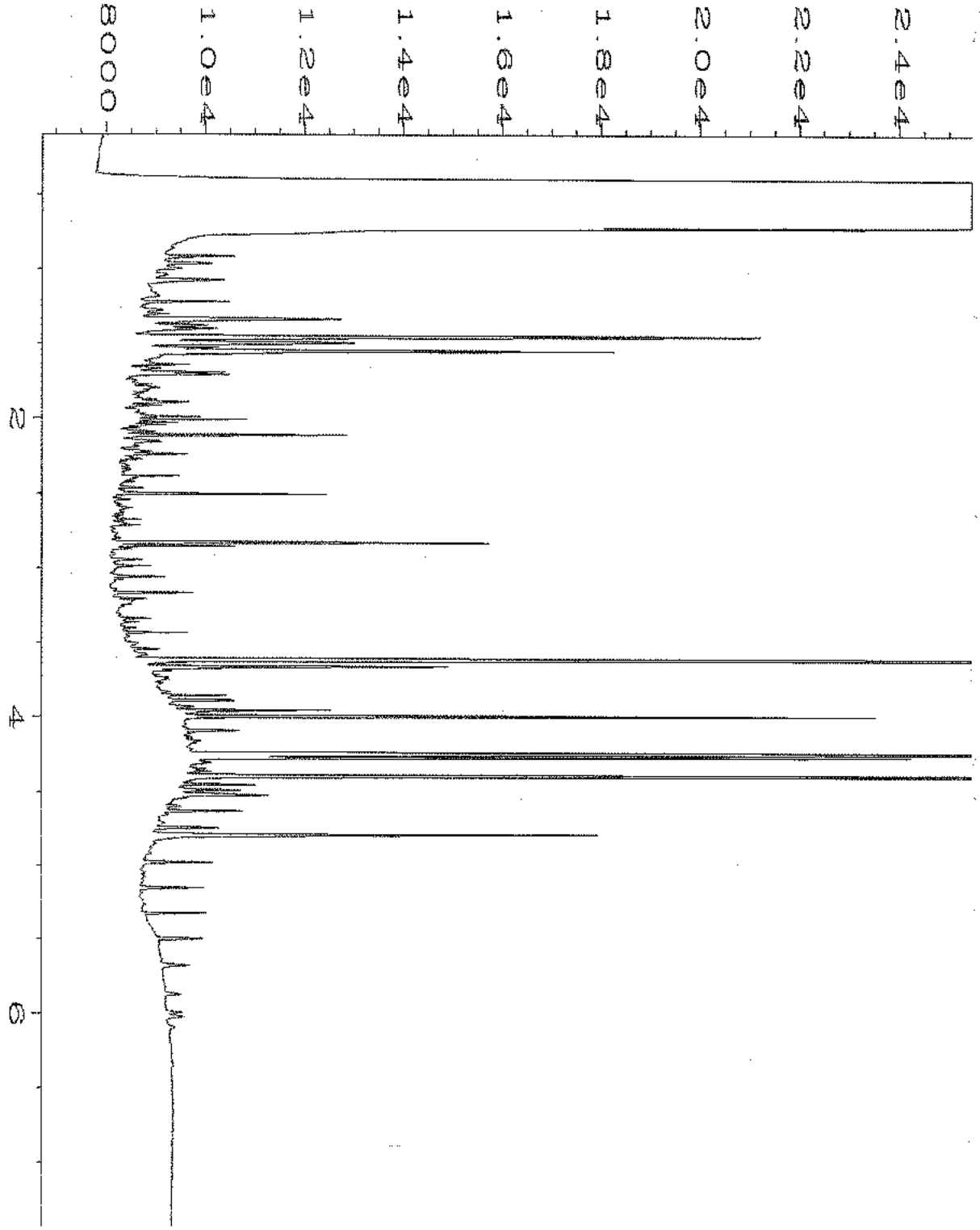
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 25
Sample Name	: 905024-14	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 14
Acquired on	: 08 May 19 06:27 PM	Instrument Method	: DX.MTH
Report Created on	: 09 May 19 10:25 AM	Analysis Method	: DX.MTH



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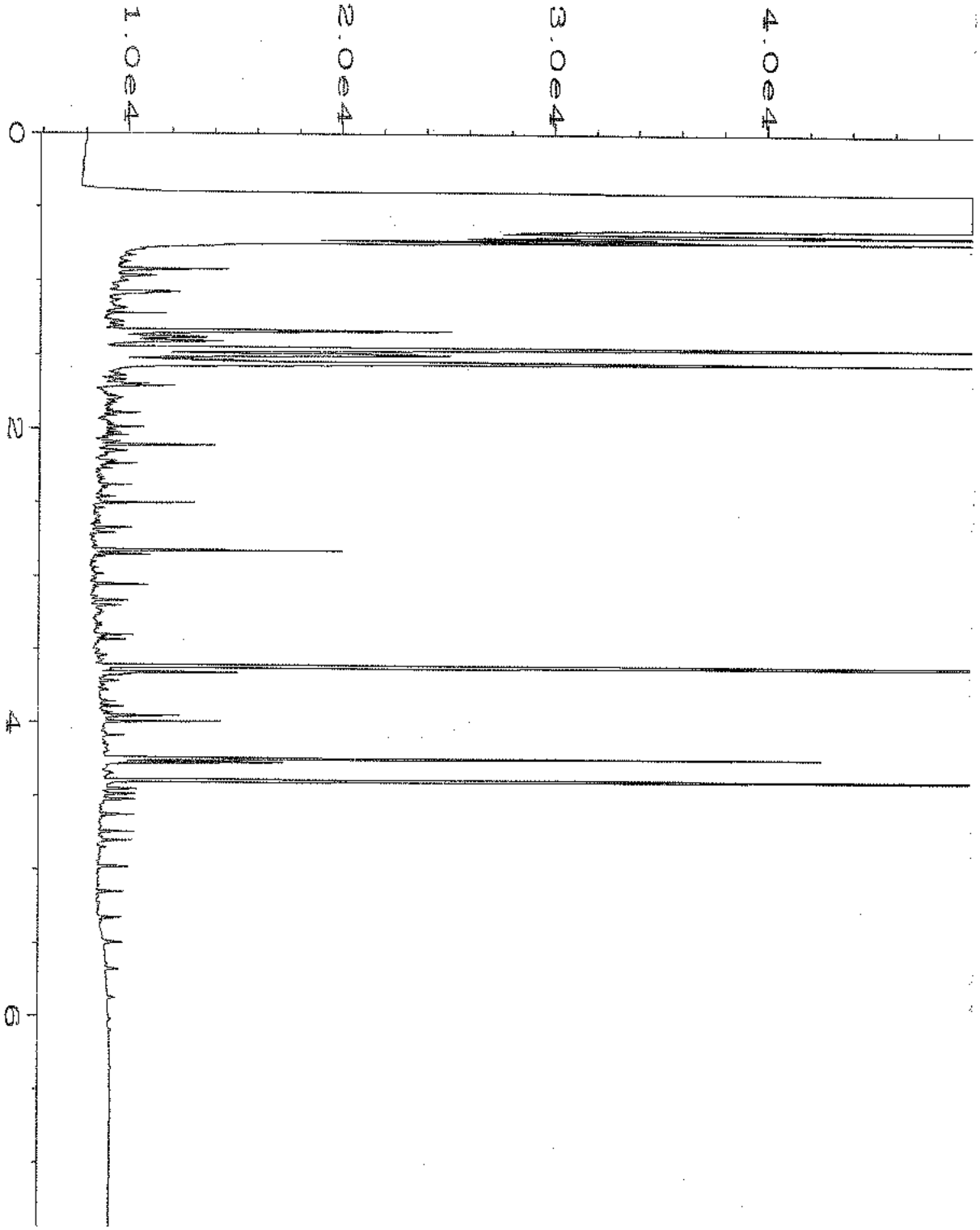
Operator : TL
Instrument : GC1
Sample Name : 905024-15
Run Time Bar Code:
Acquired on : 08 May 19 06:39 PM
Report Created on: 09 May 19 10:26 AM

Page Number : 1
Vial Number : 26
Injection Number : 1
Sequence Line : 14
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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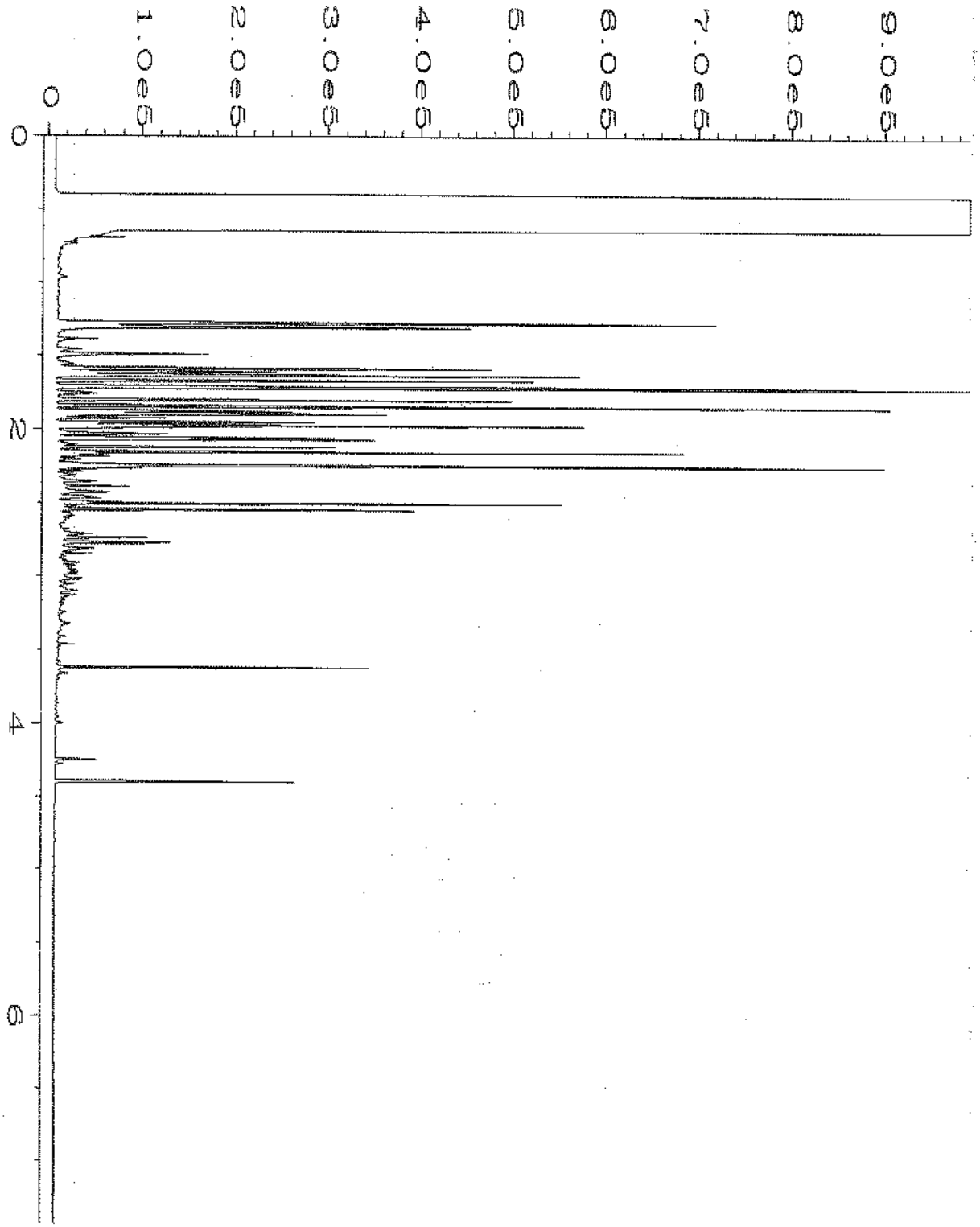
Operator : TL
Instrument : GC1
Sample Name : 905024-16
Run Time Bar Code:
Acquired on : 08 May 19 06:50 PM
Report Created on: 09 May 19 10:26 AM

Page Number : 1
Vial Number : 27
Injection Number : 1
Sequence Line : 14
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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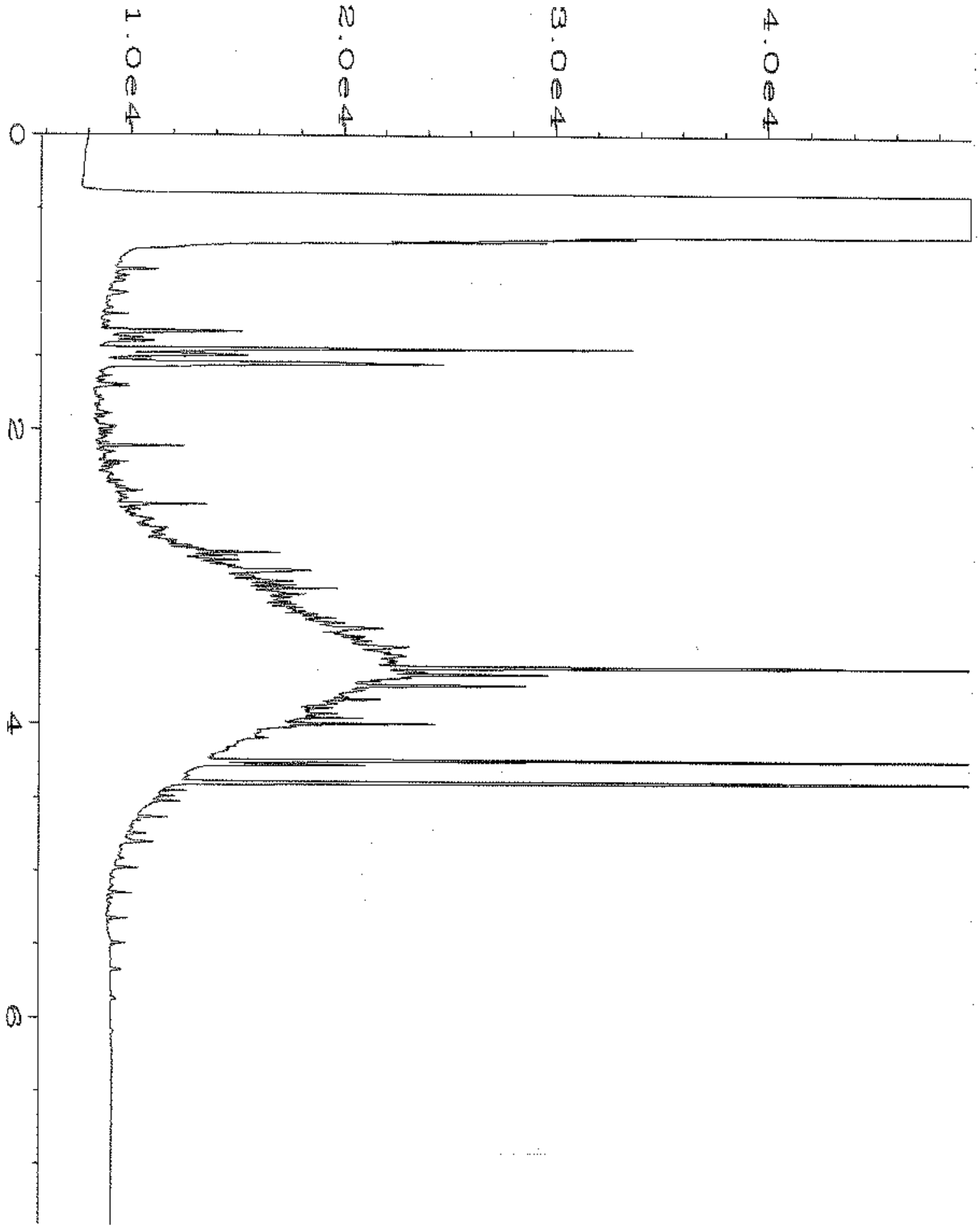
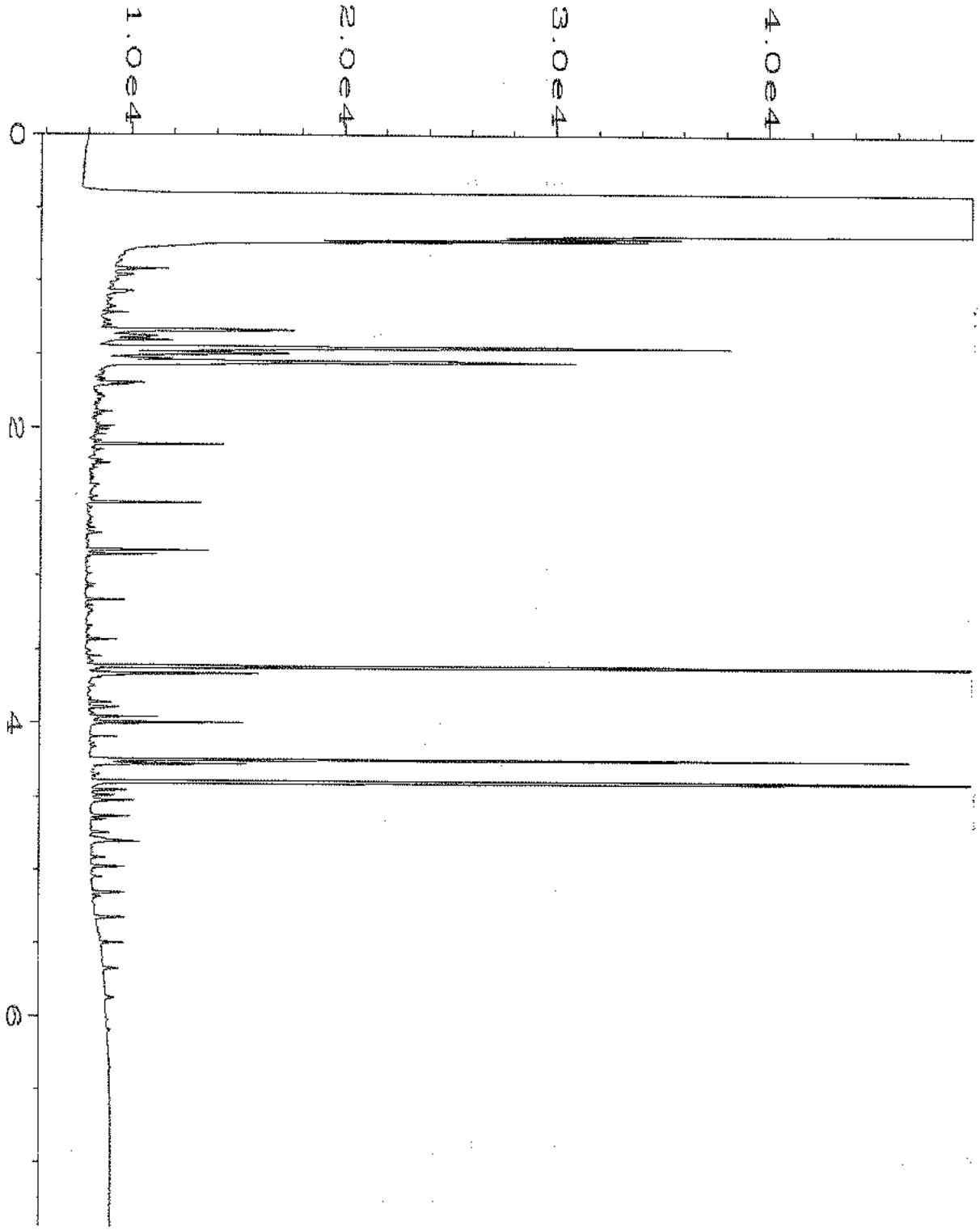
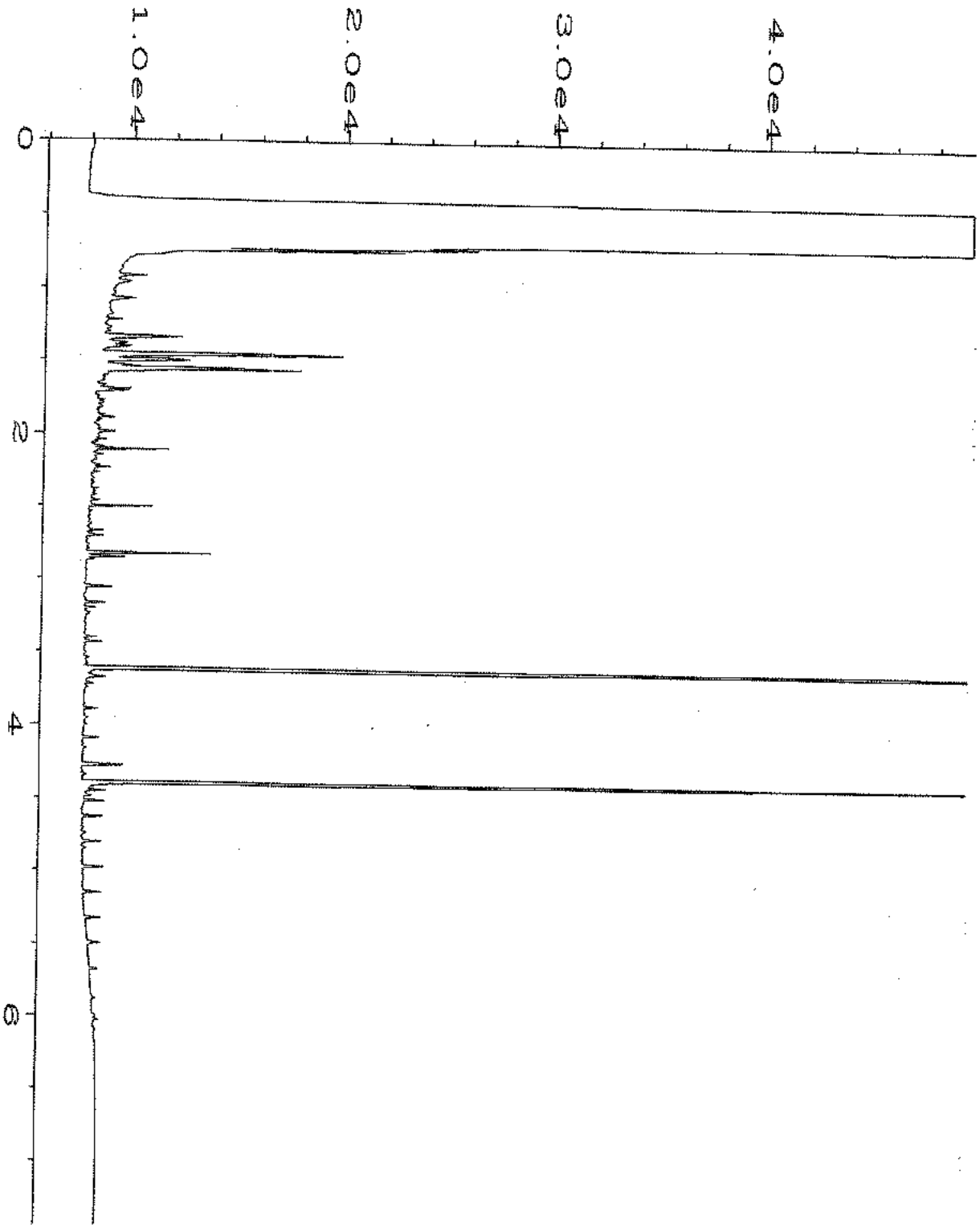
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 28
Sample Name	: 905024-17	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 14
Acquired on	: 08 May 19 07:02 PM	Instrument Method	: DX.MTH
Report Created on	: 09 May 19 10:27 AM	Analysis Method	: DX.MTH



Data File Name	: C:\HPCHEM\1\DATA\05-08-19\029F1401.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 29
Sample Name	: 905024-19	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 14
Acquired on	: 08 May 19 07:13 PM	Instrument Method	: DX.MTH
Report Created on	: 09 May 19 10:27 AM	Analysis Method	: DX.MTH

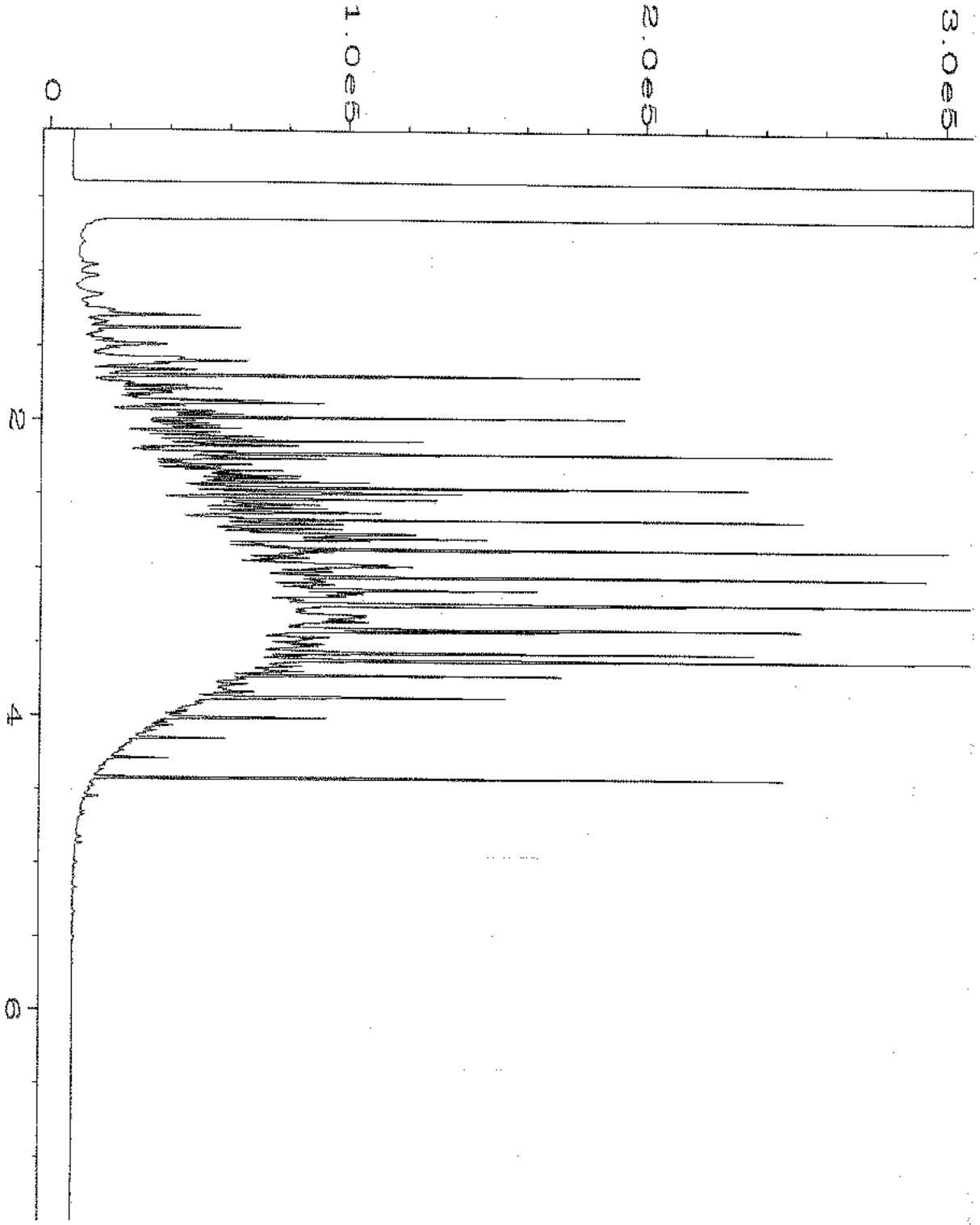


Data File Name	: C:\HPCHEM\1\DATA\05-08-19\030F1401.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 30
Sample Name	: 905024-20	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 14
Acquired on	: 08 May 19 07:24 PM	Instrument Method	: DX.MTH
Report Created on	: 09 May 19 10:27 AM	Analysis Method	: DX.MTH



Data File Name : C:\HPCHEM\1\DATA\05-08-19\010F1201.D
Operator : TL
Instrument : GC1
Sample Name : 09-1060 mb
Run Time Bar Code:
Acquired on : 08 May 19 03:12 PM
Report Created on: 09 May 19 10:27 AM

Page Number : 1
Vial Number : 10
Injection Number : 1
Sequence Line : 12
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name	: C:\HPCHEM\1\DATA\05-08-19\005F1101.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 5
Sample Name	: 1000 Dx 57-31B	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 11
Acquired on	: 08 May 19 02:53 PM	Instrument Method	: DX.MTH
Report Created on	: 09 May 19 10:28 AM	Analysis Method	: DX.MTH

905024

SAMPLE CHAIN OF CUSTODY

ME 05-01-19

Page # 1 of 2 pg4

Report To Lynn Grochala
Company Floyd Snider
Address 601 Union St, Ste 600
City, State, ZIP Seattle, WA 98101
Phone 206-292-2078 Email lynn.grochala @ floydsnider.com

SAMPLERS (signature)

PROJECT NAME: Cantera - TOC
PO #:

REMARKS: analyze TB's for TPH-G/BETX
INVOICE TO:

TURNAROUND TIME: VWS
- ☒ Standard Turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☑ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	CVOCs by 8260C	SVOCs by 8270D	CEPH Target PAHs 8270D SIM	VPH + targets	EPH + targets	Penta		Notes
01MW02-050119	01 A-D	5/1/19	~~1437~~ 1506	GW	4		X	X	X								⊗ VPH =
01MW03-050119	02		1454		4		X	X	X								VPH Test +
01MW03D-050119	03		1457		4		X	X	X								Take also VOCs
01MW11-050119	04		1445		1		X										⊗ EPH -
01MW13-050119	05 A-D		1635		4		X	X	X								EPH Test + PAHs ME still.
01MW34-050119	06		1305		1		X										~~Take also~~
01MW~~36~~35-050119	07 A-D		1335		4		X	X	X								
01MW36-050119	08		1330		1		X										
01MW47-050119	09 A-H		1039		8					⊗		⊗	X	X			
01MW48-050119	10 A-~~B~~F		1055		6		X	X	X						X		

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Layni Wachter	Layni Wachter	FloydSnider	05/1/19	17:40
Received by:	Nhan Phan	FEBI	05/01/19	17:40
Relinquished by:				
Received by:		Samples received at 4 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

905024

SAMPLE CHAIN OF CUSTODY

ME 05/01/19

Page # 2 of 2

Report To Lynn Grachala

Company Floyd Snider

Address (see p 1)

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME: Cantera - TOC

PO #

REMARKS

INVOICE TO

TURNAROUND TIME
- [x] Standard Turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Archive Samples
- [ ] Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C (VPH target)	SVOCs by 8270D	PAHs 8270D SIM (EPH target)	PAHs	VPH+target	EPH+target		Notes
01MW50-050119	01 11	5/1/19	1025	W	1		X										
01MW51-050119	02 12 A-D		1152		4		X	X	X								
01MW75-050119	03 13		1631		4		X		X								
01MW86-050119	04 14		1010		4		X	X	X								
01MW87-050119	15		1130		1		X										
01MW88-050119	16 A-D		1320		4		X						X				low volume - call if problems
01MW84-050119	17 A-E		1500		5		X	X	X				X				
01MW90-050119	18 A-H		1636		8					X		X		X	X		
01MW99-050119	19		1617		1		X										
01MW100-050119	20		1605		1		X										
TripBlank	21 AB				2			x	x								added at lab

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Layni Wachter	Layni Wachter	Floyd|Snider	05/1/19	17:40 5/4/19
Received by:	Nhan Pham	FCBT	05/01/19	1740
Relinquished by:				
Received by:		Samples received at 4 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

June 6, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included is the amended report from the testing of material submitted on May 2, 2019 from the Cantera-TOC, F&BI 905052 project. The 8260 headers have been corrected.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Chell Black
FDS0521R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
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Eric Young, B.S.

3012 16th Avenue West
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fbi@isomedia.com
www.friedmanandbruya.com

May 21, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on May 2, 2019 from the Cantera-TOC, F&BI 905052 project. There are 41 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0521R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on May 2, 2019 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera-TOC, F&BI 905052 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
905052 -01	01MW07
905052 -02	01MW15
905052 -03	01MW44
905052 -04	01MW45
905052 -05	01MW46
905052 -06	01MW53
905052 -07	01MW55
905052 -08	01MW56
905052 -09	01MW58
905052 -10	01MW60
905052 -11	01MW62
905052 -12	01MW63
905052 -13	01MW64
905052 -14	01MW70
905052 -15	01MW71
905052 -16	01MW78
905052 -17	01MW79
905052 -18	01MW80
905052 -19	01MW89
905052 -20	01MW56D
905052 -21	Trip Blank

All quality control requirements were acceptable.

Date of Report: 05/21/19
Date Received: 05/02/19
Project: Cantera-TOC, F&BI 905052
Date Extracted: 05/07/19
Date Analyzed: 05/07/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
01MW15 905052-02	<100	85
01MW44 905052-03	470	89
01MW45 905052-04	170	85
01MW55 905052-07	940	84
01MW62 905052-11	460	85
01MW63 905052-12	2,100	88
01MW70 905052-14	160	82
01MW79 905052-17	<100	82
Method Blank 09-832 MB	<100	112

Date of Report: 05/21/19
Date Received: 05/02/19
Project: Cantera-TOC, F&BI 905052
Date Extracted: 05/07/19
Date Analyzed: 05/07/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
Trip Blank 905052-21	<1	<1	<1	<3	<100	69
Method Blank 09-832 MB	<1	<1	<1	<3	<100	89

Date of Report: 05/21/19
Date Received: 05/02/19
Project: Cantera-TOC, F&BI 905052
Date Extracted: 05/08/19
Date Analyzed: 05/08/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
01MW07 905052-01	820 x	<250	94
01MW15 905052-02	220 x	<250	100
01MW44 905052-03	290 x	<250	100
01MW45 905052-04	850 x	<250	105
01MW46 905052-05	280 x	<250	105
01MW53 905052-06	94 x	<250	99
01MW55 905052-07	540 x	380 x	107
01MW56 905052-08	1,000 x	<250	98
01MW58 905052-09	100 x	<250	86
01MW60 905052-10	<50	<250	91
01MW62 905052-11	100 x	<250	95
01MW63 905052-12	830 x	340 x	103

Date of Report: 05/21/19
Date Received: 05/02/19
Project: Cantera-TOC, F&BI 905052
Date Extracted: 05/08/19
Date Analyzed: 05/08/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
01MW64 905052-13	100 x	<250	110
01MW70 905052-14	1,100 x	850 x	96
01MW79 905052-17	1,100 x	650 x	98
01MW80 905052-18	380 x	<250	81
01MW89 905052-19	200 x	<250	100
01MW56D 905052-20	920 x	<250	74
Method Blank 09-1062 MB	<50	<250	105

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	01MW71	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/07/19	Lab ID:	905052-15 1/2
Date Analyzed:	05/08/19	Data File:	050808.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	103	31	160
Benzo(a)anthracene-d12	110	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.4
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.04
1-Methylnaphthalene	<0.4
2-Methylnaphthalene	<0.4

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/07/19	Lab ID:	09-1049 mb
Date Analyzed:	05/08/19	Data File:	050806.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	106	31	160
Benzo(a)anthracene-d12	116	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.2
Acenaphthylene	<0.02
Acenaphthene	<0.02
Fluorene	<0.02
Phenanthrene	<0.02
Anthracene	<0.02
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.02
1-Methylnaphthalene	<0.2
2-Methylnaphthalene	<0.2

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW07	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-01
Date Analyzed:	05/06/19	Data File:	050632.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	102	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1.3
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	1.2
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Benzene	<0.35
Trichloroethene	3.3
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW15	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-02
Date Analyzed:	05/06/19	Data File:	050633.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	101	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	7.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	1.7
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Benzene	0.41
Trichloroethene	<1
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW44	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-03
Date Analyzed:	05/06/19	Data File:	050634.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	101	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	11
Chloroethane	<1
1,1-Dichloroethene	1.1
Methylene chloride	<5
trans-1,2-Dichloroethene	2.0
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	72
1,2-Dichloroethane (EDC)	4.8
1,1,1-Trichloroethane	<1
Benzene	13
Trichloroethene	740 ve
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW44	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-03 1/50
Date Analyzed:	05/08/19	Data File:	050833.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	12
Chloroethane	<50
1,1-Dichloroethene	<50
Methylene chloride	<250
trans-1,2-Dichloroethene	<50
1,1-Dichloroethane	<50
cis-1,2-Dichloroethene	87
1,2-Dichloroethane (EDC)	<50
1,1,1-Trichloroethane	<50
Benzene	<17
Trichloroethene	800
Toluene	<50
Tetrachloroethene	<50
Ethylbenzene	<50
m,p-Xylene	<100
o-Xylene	<50

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW45	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-04
Date Analyzed:	05/06/19	Data File:	050635.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	8.3
Chloroethane	<1
1,1-Dichloroethene	1.0
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	160 ve
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Benzene	1.6
Trichloroethene	270 ve
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW45	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-04 1/10
Date Analyzed:	05/08/19	Data File:	050829.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	12
Chloroethane	<10
1,1-Dichloroethene	<10
Methylene chloride	<50
trans-1,2-Dichloroethene	<10
1,1-Dichloroethane	<10
cis-1,2-Dichloroethene	200
1,2-Dichloroethane (EDC)	<10
1,1,1-Trichloroethane	<10
Benzene	<3.5
Trichloroethene	330
Toluene	<10
Tetrachloroethene	<10
Ethylbenzene	<10
m,p-Xylene	<20
o-Xylene	<10

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW46	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-05
Date Analyzed:	05/06/19	Data File:	050636.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	101	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	11
Chloroethane	<1
1,1-Dichloroethene	3.4
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	210 ve
1,2-Dichloroethane (EDC)	2.2
1,1,1-Trichloroethane	<1
Benzene	14
Trichloroethene	890 ve
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW46	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-05 1/50
Date Analyzed:	05/08/19	Data File:	050832.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	95	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	11
Chloroethane	<50
1,1-Dichloroethene	<50
Methylene chloride	<250
trans-1,2-Dichloroethene	<50
1,1-Dichloroethane	<50
cis-1,2-Dichloroethene	220
1,2-Dichloroethane (EDC)	<50
1,1,1-Trichloroethane	<50
Benzene	<17
Trichloroethene	880
Toluene	<50
Tetrachloroethene	<50
Ethylbenzene	<50
m,p-Xylene	<100
o-Xylene	<50

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW53 cf	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-06
Date Analyzed:	05/08/19	Data File:	050817.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.26
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	4.4
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Benzene	<0.35
Trichloroethene	<1
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW55	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-07
Date Analyzed:	05/06/19	Data File:	050638.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1.9
Chloroethane	<1
1,1-Dichloroethene	3.5
Methylene chloride	<5
trans-1,2-Dichloroethene	7.4
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	170 ve
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Benzene	1.3
Trichloroethene	2,200 ve
Toluene	<1
Tetrachloroethene	3.1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW55	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-07 1/1000
Date Analyzed:	05/08/19	Data File:	050836.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<200
Chloroethane	<1,000
1,1-Dichloroethene	<1,000
Methylene chloride	<5,000
trans-1,2-Dichloroethene	<1,000
1,1-Dichloroethane	<1,000
cis-1,2-Dichloroethene	<1,000
1,2-Dichloroethane (EDC)	<1,000
1,1,1-Trichloroethane	<1,000
Benzene	<350
Trichloroethene	2,200
Toluene	<1,000
Tetrachloroethene	<1,000
Ethylbenzene	<1,000
m,p-Xylene	<2,000
o-Xylene	<1,000

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW56	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-08
Date Analyzed:	05/08/19	Data File:	050819.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	97	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.61
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Benzene	<0.35
Trichloroethene	<1
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW58	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-09
Date Analyzed:	05/06/19	Data File:	050640.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.30
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	1.6
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	42
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW60	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-10
Date Analyzed:	05/06/19	Data File:	050641.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	15
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW62 cf	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-11
Date Analyzed:	05/06/19	Data File:	050642.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	15
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Benzene	0.35
Trichloroethene	740 ve
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW62 cf	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-11 1/50
Date Analyzed:	05/08/19	Data File:	050831.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<10
Chloroethane	<50
1,1-Dichloroethene	<50
Methylene chloride	<250
trans-1,2-Dichloroethene	<50
1,1-Dichloroethane	<50
cis-1,2-Dichloroethene	<50
1,2-Dichloroethane (EDC)	<50
1,1,1-Trichloroethane	<50
Benzene	<17
Trichloroethene	850
Toluene	<50
Tetrachloroethene	<50
Ethylbenzene	<50
m,p-Xylene	<100
o-Xylene	<50

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW63	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-12
Date Analyzed:	05/06/19	Data File:	050643.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	39
Chloroethane	<1
1,1-Dichloroethene	6.5
Methylene chloride	<5
trans-1,2-Dichloroethene	6.1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	370 ve
1,2-Dichloroethane (EDC)	1.7
1,1,1-Trichloroethane	<1
Benzene	4.3
Trichloroethene	3,800 ve
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW63	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-12 1/1000
Date Analyzed:	05/08/19	Data File:	050837.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<200
Chloroethane	<1,000
1,1-Dichloroethene	<1,000
Methylene chloride	<5,000
trans-1,2-Dichloroethene	<1,000
1,1-Dichloroethane	<1,000
cis-1,2-Dichloroethene	<1,000
1,2-Dichloroethane (EDC)	<1,000
1,1,1-Trichloroethane	<1,000
Benzene	<350
Trichloroethene	5,900
Toluene	<1,000
Tetrachloroethene	<1,000
Ethylbenzene	<1,000
m,p-Xylene	<2,000
o-Xylene	<1,000

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW70	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-14
Date Analyzed:	05/06/19	Data File:	050644.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.69
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	58
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	43
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	260 ve
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW70	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-14 1/10
Date Analyzed:	05/08/19	Data File:	050830.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<2
Chloroethane	<10
1,1-Dichloroethene	<10
Methylene chloride	<50
trans-1,2-Dichloroethene	71
1,1-Dichloroethane	<10
cis-1,2-Dichloroethene	52
1,2-Dichloroethane (EDC)	<10
1,1,1-Trichloroethane	<10
Trichloroethene	310
Tetrachloroethene	<10

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW71	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-15
Date Analyzed:	05/06/19	Data File:	050645.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	7.9
Chloroethane	<1
1,1-Dichloroethene	13
Methylene chloride	<5
trans-1,2-Dichloroethene	17
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	120
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	2,700 ve
Tetrachloroethene	<1
Hexane	<1
Methyl t-butyl ether (MTBE)	<1
1,2-Dibromoethane (EDB)	<1
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW71	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-15 1/1000
Date Analyzed:	05/08/19	Data File:	050835.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	93	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<200
Chloroethane	<1,000
1,1-Dichloroethene	<1,000
Methylene chloride	<5,000
trans-1,2-Dichloroethene	<1,000
1,1-Dichloroethane	<1,000
cis-1,2-Dichloroethene	<1,000
1,2-Dichloroethane (EDC)	<1,000
1,1,1-Trichloroethane	<1,000
Trichloroethene	2,800
Tetrachloroethene	<1,000
Hexane	<1,000
Methyl t-butyl ether (MTBE)	<1,000
1,2-Dibromoethane (EDB)	<1,000
Benzene	<350
Toluene	<1,000
Ethylbenzene	<1,000
m,p-Xylene	<2,000
o-Xylene	<1,000

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW78 cf	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-16
Date Analyzed:	05/08/19	Data File:	050818.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	5.5
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	1.2
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW79	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-17
Date Analyzed:	05/06/19	Data File:	050647.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	101	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	3.8
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	1.5
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	28
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	61
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW80	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-18
Date Analyzed:	05/06/19	Data File:	050648.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	8.5
Chloroethane	<1
1,1-Dichloroethene	2.8
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	210 ve
1,2-Dichloroethane (EDC)	1.3
1,1,1-Trichloroethane	<1
Benzene	13
Trichloroethene	580 ve
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW80	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-18 1/10
Date Analyzed:	05/08/19	Data File:	050827.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	101	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	10
Chloroethane	<10
1,1-Dichloroethene	<10
Methylene chloride	<50
trans-1,2-Dichloroethene	<10
1,1-Dichloroethane	<10
cis-1,2-Dichloroethene	250
1,2-Dichloroethane (EDC)	<10
1,1,1-Trichloroethane	<10
Benzene	16
Trichloroethene	710
Toluene	<10
Tetrachloroethene	<10
Ethylbenzene	<10
m,p-Xylene	<20
o-Xylene	<10

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW56D	Client:	Floyd-Snider
Date Received:	05/02/19	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	905052-20
Date Analyzed:	05/08/19	Data File:	050820.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	102	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.60
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Benzene	<0.35
Trichloroethene	<1
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 905052
Date Extracted:	05/06/19	Lab ID:	09-1018 mb
Date Analyzed:	05/06/19	Data File:	050611.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	94	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1
Hexane	<1
Methyl t-butyl ether (MTBE)	<1
1,2-Dibromoethane (EDB)	<1
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Date of Report: 05/21/19
Date Received: 05/02/19
Project: Cantera-TOC, F&BI 905052

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 905052-02 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	101	65-118
Toluene	ug/L (ppb)	50	98	72-122
Ethylbenzene	ug/L (ppb)	50	91	73-126
Xylenes	ug/L (ppb)	150	95	74-118
Gasoline	ug/L (ppb)	1,000	118	69-134

Date of Report: 05/21/19
Date Received: 05/02/19
Project: Cantera-TOC, F&BI 905052

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	109	111	63-142	2

Date of Report: 05/21/19
Date Received: 05/02/19
Project: Cantera-TOC, F&BI 905052

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	1	68	69	67-116	1
2-Methylnaphthalene	ug/L (ppb)	1	73	75	63-122	3
1-Methylnaphthalene	ug/L (ppb)	1	73	75	65-122	3
Acenaphthylene	ug/L (ppb)	1	79	79	65-119	0
Acenaphthene	ug/L (ppb)	1	77	76	66-118	1
Fluorene	ug/L (ppb)	1	84	83	64-125	1
Phenanthrene	ug/L (ppb)	1	84	82	67-120	2
Anthracene	ug/L (ppb)	1	86	84	65-122	2
Fluoranthene	ug/L (ppb)	1	90	89	65-127	1
Pyrene	ug/L (ppb)	1	90	97	62-130	7
Benz(a)anthracene	ug/L (ppb)	1	94	92	60-118	2
Chrysene	ug/L (ppb)	1	92	90	66-125	2
Benzo(b)fluoranthene	ug/L (ppb)	1	87	86	55-135	1
Benzo(k)fluoranthene	ug/L (ppb)	1	86	87	62-125	1
Benzo(a)pyrene	ug/L (ppb)	1	90	89	58-127	1
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	94	89	36-142	5
Dibenz(a,h)anthracene	ug/L (ppb)	1	89	85	37-133	5
Benzo(g,h,i)perylene	ug/L (ppb)	1	87	83	34-135	5

Date of Report: 05/21/19
Date Received: 05/02/19
Project: Cantera-TOC, F&BI 905052

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 905052-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	50	1.9	91	61-139
Chloroethane	ug/L (ppb)	50	<1	86	55-149
1,1-Dichloroethene	ug/L (ppb)	50	3.5	92	71-123
Hexane	ug/L (ppb)	50	<1	100	44-139
Methylene chloride	ug/L (ppb)	50	<5	82	61-126
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	89	68-125
trans-1,2-Dichloroethene	ug/L (ppb)	50	7.4	93	72-122
1,1-Dichloroethane	ug/L (ppb)	50	<1	95	79-113
cis-1,2-Dichloroethene	ug/L (ppb)	50	170	101 b	63-126
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	94	70-119
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	98	75-121
Benzene	ug/L (ppb)	50	1.3	94	75-114
Trichloroethene	ug/L (ppb)	50	2,200	433 b	73-122
Toluene	ug/L (ppb)	50	<1	98	73-117
Tetrachloroethene	ug/L (ppb)	50	3.1	100	72-113
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	<1	104	79-120
Ethylbenzene	ug/L (ppb)	50	<1	97	66-124
m,p-Xylene	ug/L (ppb)	100	<2	99	63-128
o-Xylene	ug/L (ppb)	50	<1	92	64-129

Date of Report: 05/21/19
Date Received: 05/02/19
Project: Cantera-TOC, F&BI 905052

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	107	97	70-128	10
Chloroethane	ug/L (ppb)	50	104	90	66-149	14
1,1-Dichloroethene	ug/L (ppb)	50	111	96	75-119	14
Hexane	ug/L (ppb)	50	103	99	51-153	4
Methylene chloride	ug/L (ppb)	50	101	88	63-132	14
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	105	94	70-122	11
trans-1,2-Dichloroethene	ug/L (ppb)	50	111	98	76-118	12
1,1-Dichloroethane	ug/L (ppb)	50	111	99	77-119	11
cis-1,2-Dichloroethene	ug/L (ppb)	50	115	102	76-119	12
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	97	97	78-114	0
1,1,1-Trichloroethane	ug/L (ppb)	50	115	102	80-116	12
Benzene	ug/L (ppb)	50	101	97	75-116	4
Trichloroethene	ug/L (ppb)	50	99	98	72-119	1
Toluene	ug/L (ppb)	50	101	96	79-115	5
Tetrachloroethene	ug/L (ppb)	50	103	98	78-109	5
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	96	102	82-118	6
Ethylbenzene	ug/L (ppb)	50	100	96	83-111	4
m,p-Xylene	ug/L (ppb)	100	103	99	84-112	4
o-Xylene	ug/L (ppb)	50	103	92	81-117	11

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

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Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 905052
Work Order Number: 1905058

May 17, 2019

Attention Michael Erdahl:

Fremont Analytical, Inc. received 1 sample(s) on 5/3/2019 for the analyses presented in the following report.

Extractable Petroleum Hydrocarbons by NWEPH
Volatile Petroleum Hydrocarbons by NWVPH

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

Date: *05/17/2019*

CLIENT: Friedman & Bruya
Project: 905052
Work Order: 1905058

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1905058-001	01MW71	05/02/2019 10:50 AM	05/03/2019 11:11 AM

Case Narrative

WO#: **1905058**
Date: **5/17/2019**

CLIENT: Friedman & Bruya
Project: 905052

WorkOrder Narrative:
I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **1905058**
Date Reported: **5/17/2019**

Client: Friedman & Bruya
Collection Date: 5/2/2019 10:50:00 AM
Project: 905052
Lab ID: 1905058-001
Matrix: Water
Client Sample ID: **01MW71**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 24488		Analyst: DW
Aliphatic Hydrocarbon (C10-C12)	ND	20.7	*	µg/L	1	5/16/2019 8:08:00 PM
Aliphatic Hydrocarbon (C12-C16)	ND	20.7		µg/L	1	5/16/2019 8:08:00 PM
Aliphatic Hydrocarbon (C16-C21)	ND	20.7		µg/L	1	5/16/2019 8:08:00 PM
Aliphatic Hydrocarbon (C21-C34)	ND	20.7		µg/L	1	5/16/2019 8:08:00 PM
Aliphatic Hydrocarbon (C8-C10)	ND	41.4	*	µg/L	1	5/16/2019 8:08:00 PM
Aromatic Hydrocarbon (C10-C12)	ND	20.7		µg/L	1	5/17/2019 2:01:00 AM
Aromatic Hydrocarbon (C12-C16)	ND	20.7		µg/L	1	5/17/2019 2:01:00 AM
Aromatic Hydrocarbon (C16-C21)	ND	20.7		µg/L	1	5/17/2019 2:01:00 AM
Aromatic Hydrocarbon (C21-C34)	ND	20.7		µg/L	1	5/17/2019 2:01:00 AM
Aromatic Hydrocarbon (C8-C10)	ND	20.7	*	µg/L	1	5/17/2019 2:01:00 AM
Surr: 1-Chlorooctadecane	74.6	60 - 140		%Rec	1	5/16/2019 8:08:00 PM
Surr: o-Terphenyl	60.1	60 - 140		%Rec	1	5/17/2019 2:01:00 AM

NOTES:
* - Flagged value is not within established control limits.

Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 24485		Analyst: CR
Aliphatic Hydrocarbon (C5-C6)	89.2	40.0		µg/L	1	5/9/2019 8:14:45 AM
Aliphatic Hydrocarbon (C6-C8)	ND	20.0		µg/L	1	5/9/2019 8:14:45 AM
Aliphatic Hydrocarbon (C8-C10)	ND	20.0		µg/L	1	5/9/2019 8:14:45 AM
Aliphatic Hydrocarbon (C10-C12)	ND	20.0		µg/L	1	5/9/2019 8:14:45 AM
Aromatic Hydrocarbon (C8-C10)	ND	50.0		µg/L	1	5/9/2019 8:14:45 AM
Aromatic Hydrocarbon (C10-C12)	ND	20.0		µg/L	1	5/9/2019 8:14:45 AM
Aromatic Hydrocarbon (C12-C13)	ND	20.0		µg/L	1	5/9/2019 8:14:45 AM
Benzene	ND	20.0		µg/L	1	5/9/2019 8:14:45 AM
Toluene	ND	20.0		µg/L	1	5/9/2019 8:14:45 AM
Ethylbenzene	ND	20.0		µg/L	1	5/9/2019 8:14:45 AM
m,p-Xylene	ND	40.0		µg/L	1	5/9/2019 8:14:45 AM
o-Xylene	ND	20.0		µg/L	1	5/9/2019 8:14:45 AM
Naphthalene	ND	20.0		µg/L	1	5/9/2019 8:14:45 AM
Methyl tert-butyl ether (MTBE)	ND	20.0		µg/L	1	5/9/2019 8:14:45 AM
Surr: 1,4-Difluorobenzene	99.8	65 - 140		%Rec	1	5/9/2019 8:14:45 AM
Surr: Bromofluorobenzene	105	65 - 140		%Rec	1	5/9/2019 8:14:45 AM

Work Order: 1905058
CLIENT: Friedman & Bruya
Project: 905052

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID **MB-24488** SampType: **MBLK** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **MBLKW** Batch ID: **24488** Analysis Date: **5/14/2019** SeqNo: **1013513**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	ND	20.1		0	0						
Aromatic Hydrocarbon (C12-C16)	ND	20.1		0	0						
Aromatic Hydrocarbon (C16-C21)	ND	20.1		0	0						
Aromatic Hydrocarbon (C21-C34)	ND	20.1		0	0						
Aromatic Hydrocarbon (C8-C10)	ND	20.1		0	0						*
Surr: o-Terphenyl	1,420		2,010		70.7	60	140				

NOTES:
* - Flagged value is not within established control limits.

Sample ID **LCS-24488** SampType: **LCS** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW** Batch ID: **24488** Analysis Date: **5/14/2019** SeqNo: **1013510**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	1,770	19.9	2,489	0	70.9	70	130				
Aromatic Hydrocarbon (C12-C16)	1,960	19.9	2,489	0	78.7	70	130				
Aromatic Hydrocarbon (C16-C21)	2,160	19.9	2,489	0	86.7	70	130				
Aromatic Hydrocarbon (C21-C34)	2,320	19.9	2,489	0	93.1	70	130				
Aromatic Hydrocarbon (C8-C10)	1,460	19.9	2,489	0	58.8	70	130				S
Surr: o-Terphenyl	1,450		1,991		72.8	60	140				

NOTES:
S - Outlying spike recovery observed (low bias). Samples will be qualified with a *.

Sample ID **LCSD-24488** SampType: **LCSD** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW02** Batch ID: **24488** Analysis Date: **5/14/2019** SeqNo: **1013511**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	1,820	20.0	2,504	0	72.6	70	130	1,766	2.95	20	
Aromatic Hydrocarbon (C12-C16)	2,130	20.0	2,504	0	84.9	70	130	1,959	8.25	20	
Aromatic Hydrocarbon (C16-C21)	2,210	20.0	2,504	0	88.1	70	130	2,157	2.29	20	
Aromatic Hydrocarbon (C21-C34)	2,270	20.0	2,504	0	90.7	70	130	2,317	2.00	20	
Aromatic Hydrocarbon (C8-C10)	1,480	20.0	2,504	0	59.1	70	130	1,464	1.05	20	S
Surr: o-Terphenyl	1,540		2,003		77.0	60	140		0		

Work Order: 1905058
CLIENT: Friedman & Bruya
Project: 905052

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID	**LCSD-24488**	SampType:	**LCSD**			Units:	**µg/L**		Prep Date:	**5/8/2019**		RunNo:	**51451**	
Client ID:	**LCSW02**	Batch ID:	**24488**						Analysis Date:	**5/14/2019**		SeqNo:	**1013511**	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		

NOTES:
S - Outlying spike recovery observed (low bias). Samples will be qualified with a *.

Sample ID	**MB-24488**	SampType:	**MBLK**			Units:	**µg/L**		Prep Date:	**5/8/2019**		RunNo:	**51451**	
Client ID:	**MBLKW**	Batch ID:	**24488**						Analysis Date:	**5/15/2019**		SeqNo:	**1013559**	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Aliphatic Hydrocarbon (C10-C12)		ND	20.1		0	0						*		
Aliphatic Hydrocarbon (C12-C16)		ND	20.1		0	0								
Aliphatic Hydrocarbon (C16-C21)		ND	20.1		0	0								
Aliphatic Hydrocarbon (C21-C34)		ND	20.1		0	0								
Aliphatic Hydrocarbon (C8-C10)		ND	40.2		0	0						*		
Surr: 1-Chlorooctadecane		1,510		2,010		75.1	60	140						

NOTES:
* - Flagged value is not within established control limits.

Sample ID	**LCS-24488**	SampType:	**LCS**			Units:	**µg/L**		Prep Date:	**5/8/2019**		RunNo:	**51451**	
Client ID:	**LCSW**	Batch ID:	**24488**						Analysis Date:	**5/15/2019**		SeqNo:	**1013557**	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Aliphatic Hydrocarbon (C10-C12)		1,520	19.9	2,489	0	60.9	70	130				S		
Aliphatic Hydrocarbon (C12-C16)		1,880	19.9	2,489	0	75.7	70	130						
Aliphatic Hydrocarbon (C16-C21)		2,050	19.9	2,489	0	82.2	70	130						
Aliphatic Hydrocarbon (C21-C34)		4,050	19.9	4,979	0	81.3	70	130						
Aliphatic Hydrocarbon (C8-C10)		785	39.8	2,489	0	31.5	70	130				S		
Surr: 1-Chlorooctadecane		1,590		1,991		80.0	60	140						

NOTES:
S - Outlying spike recovery observed (Aliphatic Hydrocarbon (C8-C10) and (C10-C12); low bias). Samples will be qualified with a *.

Work Order: 1905058
CLIENT: Friedman & Bruya
Project: 905052

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID **LCSD-24488** SampType: **LCSD** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW02** Batch ID: **24488** Analysis Date: **5/15/2019** SeqNo: **1013558**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	1,540	20.0	5,008	0	30.8	70	130	1,516	1.73	20	S
Aliphatic Hydrocarbon (C12-C16)	1,550	20.0	5,008	0	30.9	70	130	1,885	19.7	20	S
Aliphatic Hydrocarbon (C16-C21)	1,980	20.0	5,008	0	39.6	70	130	2,047	3.15	20	S
Aliphatic Hydrocarbon (C21-C34)	3,450	20.0	5,008	0	68.9	70	130	4,048	15.9	20	S
Aliphatic Hydrocarbon (C8-C10)	735	40.1	10,020	0	7.34	70	130	784.9	6.52	20	S
Surr: 1-Chlorooctadecane	1,400		2,003		69.8	60	140		0		

NOTES:
S - Outlying spike recovery(ies) observed. A duplicate analysis was performed and recovered within range (Aliphatic Hydrocarbon (C12-C16), (C16-C21), and (C21-C34)).
S - Outlying spike recovery observed (Aliphatic Hydrocarbon (C8-C10) and (C10-C12); low bias). Samples will be qualified with a *.

Sample ID **1905093-001ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **BATCH** Batch ID: **24488** Analysis Date: **5/16/2019** SeqNo: **1015489**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	ND	25.4		0	0			0		25	*
Aliphatic Hydrocarbon (C12-C16)	ND	25.4		0	0			0		25	
Aliphatic Hydrocarbon (C16-C21)	ND	25.4		0	0			0		25	
Aliphatic Hydrocarbon (C21-C34)	ND	25.4		0	0			0		25	
Aliphatic Hydrocarbon (C8-C10)	ND	50.8		0	0			0		25	*
Surr: 1-Chlorooctadecane	2,270		2,540		89.3	60	140		0		

NOTES:
* - Flagged value is not within established control limits.

Sample ID **1905093-001ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **BATCH** Batch ID: **24488** Analysis Date: **5/17/2019** SeqNo: **1015495**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	ND	25.4		0	0			0		25	
Aromatic Hydrocarbon (C12-C16)	41.7	25.4		0	0			22.91	58.1	25	
Aromatic Hydrocarbon (C16-C21)	ND	25.4		0	0			0		25	
Aromatic Hydrocarbon (C21-C34)	ND	25.4		0	0			0		25	
Aromatic Hydrocarbon (C8-C10)	ND	25.4		0	0			0		25	*

Work Order: 1905058
CLIENT: Friedman & Bruya
Project: 905052

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID **1905093-001ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **BATCH** Batch ID: **24488** Analysis Date: **5/17/2019** SeqNo: **1015495**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: o-Terphenyl	1,830		2,540		71.9	60	140		0		

Work Order: 1905058
CLIENT: Friedman & Bruya
Project: 905052

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID **LCS-24485** SampType: **LCS** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51316**
Client ID: **LCSW** Batch ID: **24485** Analysis Date: **5/9/2019** SeqNo: **1010081**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	582	40.0	600.0	0	97.1	70	130				
Aliphatic Hydrocarbon (C6-C8)	208	20.0	200.0	0	104	70	130				
Aliphatic Hydrocarbon (C8-C10)	192	20.0	200.0	0	96.1	70	130				
Aliphatic Hydrocarbon (C10-C12)	201	20.0	200.0	0	101	70	130				
Aromatic Hydrocarbon (C8-C10)	786	50.0	800.0	0	98.3	70	130				
Aromatic Hydrocarbon (C10-C12)	194	20.0	200.0	0	96.9	70	130				
Aromatic Hydrocarbon (C12-C13)	213	20.0	200.0	0	106	70	130				
Benzene	196	20.0	200.0	0	97.9	70	130				
Toluene	196	20.0	200.0	0	97.9	70	130				
Ethylbenzene	194	20.0	200.0	0	97.2	70	130				
m,p-Xylene	393	40.0	400.0	0	98.2	70	130				
o-Xylene	197	20.0	200.0	0	98.5	70	130				
Naphthalene	208	20.0	200.0	0	104	70	130				
Methyl tert-butyl ether (MTBE)	208	20.0	200.0	0	104	70	130				
Surr: 1,4-Difluorobenzene	51.8		50.00		104	65	140				
Surr: Bromofluorobenzene	53.0		50.00		106	65	140				

Sample ID **LCSD-24485** SampType: **LCSD** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51316**
Client ID: **LCSW02** Batch ID: **24485** Analysis Date: **5/9/2019** SeqNo: **1010082**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	611	40.0	600.0	0	102	70	130	582.5	4.75	20	
Aliphatic Hydrocarbon (C6-C8)	198	20.0	200.0	0	99.1	70	130	207.6	4.69	20	
Aliphatic Hydrocarbon (C8-C10)	189	20.0	200.0	0	94.7	70	130	192.1	1.43	20	
Aliphatic Hydrocarbon (C10-C12)	207	20.0	200.0	0	104	70	130	201.1	3.10	20	
Aromatic Hydrocarbon (C8-C10)	813	50.0	800.0	0	102	70	130	786.3	3.28	20	
Aromatic Hydrocarbon (C10-C12)	197	20.0	200.0	0	98.6	70	130	193.8	1.74	20	
Aromatic Hydrocarbon (C12-C13)	196	20.0	200.0	0	98.0	70	130	212.7	8.14	20	
Benzene	202	20.0	200.0	0	101	70	130	195.9	3.01	20	
Toluene	202	20.0	200.0	0	101	70	130	195.8	3.14	20	

Work Order: 1905058
CLIENT: Friedman & Bruya
Project: 905052

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID **LCSD-24485** SampType: **LCSD** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51316**
Client ID: **LCSW02** Batch ID: **24485** Analysis Date: **5/9/2019** SeqNo: **1010082**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethylbenzene	202	20.0	200.0	0	101	70	130	194.4	3.78	20	
m,p-Xylene	408	40.0	400.0	0	102	70	130	392.9	3.79	20	
o-Xylene	203	20.0	200.0	0	102	70	130	197.0	3.13	20	
Naphthalene	213	20.0	200.0	0	106	70	130	208.3	2.10	20	
Methyl tert-butyl ether (MTBE)	207	20.0	200.0	0	104	70	130	207.5	0.181	20	
Surr: 1,4-Difluorobenzene	51.0		50.00		102	65	140		0		
Surr: Bromofluorobenzene	51.8		50.00		104	65	140		0		

Sample ID **MB-24485** SampType: **MBLK** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51316**
Client ID: **MBLKW** Batch ID: **24485** Analysis Date: **5/9/2019** SeqNo: **1010083**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	ND	40.0		0	0						
Aliphatic Hydrocarbon (C6-C8)	ND	20.0		0	0						
Aliphatic Hydrocarbon (C8-C10)	ND	20.0		0	0						
Aliphatic Hydrocarbon (C10-C12)	ND	20.0		0	0						
Aromatic Hydrocarbon (C8-C10)	ND	50.0		0	0						
Aromatic Hydrocarbon (C10-C12)	ND	20.0		0	0						
Aromatic Hydrocarbon (C12-C13)	ND	20.0		0	0						
Benzene	ND	20.0		0	0						
Toluene	ND	20.0		0	0						
Ethylbenzene	ND	20.0		0	0						
m,p-Xylene	ND	40.0		0	0						
o-Xylene	ND	20.0		0	0						
Naphthalene	ND	20.0		0	0						
Methyl tert-butyl ether (MTBE)	ND	20.0		0	0						
Surr: 1,4-Difluorobenzene	48.5		50.00		97.0	65	140				
Surr: Bromofluorobenzene	50.9		50.00		102	65	140				

Work Order: 1905058
CLIENT: Friedman & Bruya
Project: 905052

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID **1905058-001BDUP** SampType: **DUP** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51316**
Client ID: **01MW71** Batch ID: **24485** Analysis Date: **5/9/2019** SeqNo: **1010077**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	93.4	40.0		0	0			89.20	4.64	25	
Aliphatic Hydrocarbon (C6-C8)	ND	20.0		0	0			0		25	
Aliphatic Hydrocarbon (C8-C10)	ND	20.0		0	0			0		25	
Aliphatic Hydrocarbon (C10-C12)	ND	20.0		0	0			0		25	
Aromatic Hydrocarbon (C8-C10)	ND	50.0		0	0			0		25	
Aromatic Hydrocarbon (C10-C12)	ND	20.0		0	0			0		25	
Aromatic Hydrocarbon (C12-C13)	ND	20.0		0	0			0		25	
Benzene	ND	20.0		0	0			0		25	
Toluene	ND	20.0		0	0			0		25	
Ethylbenzene	ND	20.0		0	0			0		25	
m,p-Xylene	ND	40.0		0	0			0		25	
o-Xylene	ND	20.0		0	0			0		25	
Naphthalene	ND	20.0		0	0			0		25	
Methyl tert-butyl ether (MTBE)	ND	20.0		0	0			0		25	
Surr: 1,4-Difluorobenzene	50.1		50.00		100	65	140		0		
Surr: Bromofluorobenzene	52.1		50.00		104	65	140		0		

Sample Log-In Check List

Client Name:	**FB**	Work Order Number:	**1905058**
Logged by:	**Clare Griggs**	Date Received:	**5/3/2019 11:11:00 AM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	FedEx		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☑	Not Required ☐
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >0°C to 10.0°C*	Yes ☑	No ☐	NA ☐
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☑	NA ☐
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Cooler	8.6
Sample	9.1

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

SUBCONTRACT SAMPLE CHAIN OF CUSTODY 1905058

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 Fax # (206) 283-5044

SUBCONTRACTER Fremont

PROJECT NAME/NO. 905052

PO # B-248

REMARKS Flag Snider EDD
Please Email Results

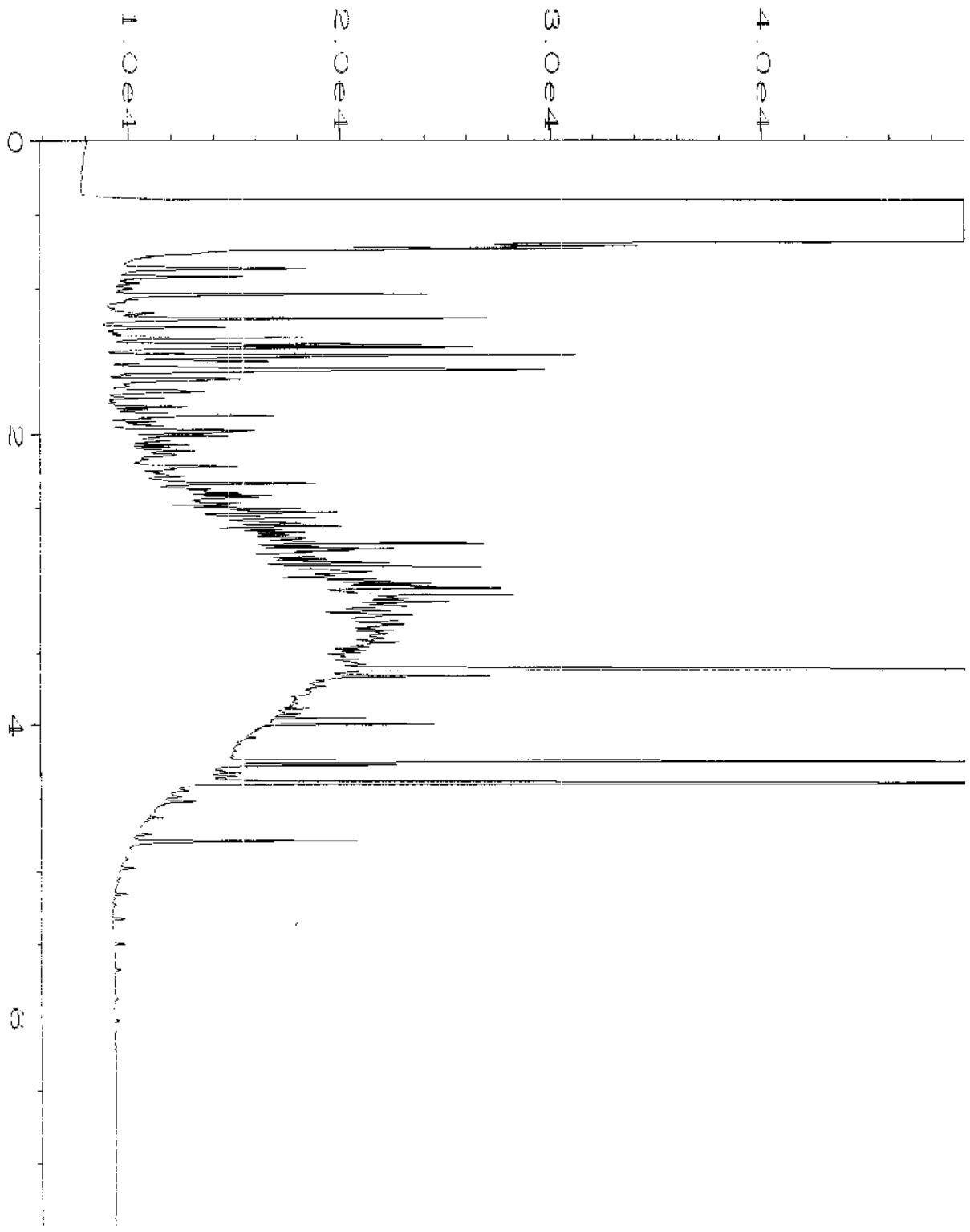
TURNAROUND TIME
☒ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: Dioxins/Furans	EPH	VPH								Notes
01MW71		5/2/19	1050	H_2O	4		x	x								

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	5/3/19	9:00 AM
Received by:		Casey O'Keefe	FAI	5/3/19	11:11
Relinquished by:					
Received by:					



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Instrument	: GC1	Vial Number	: 37
Sample Name	: 905052-01	Injection Number	: 1
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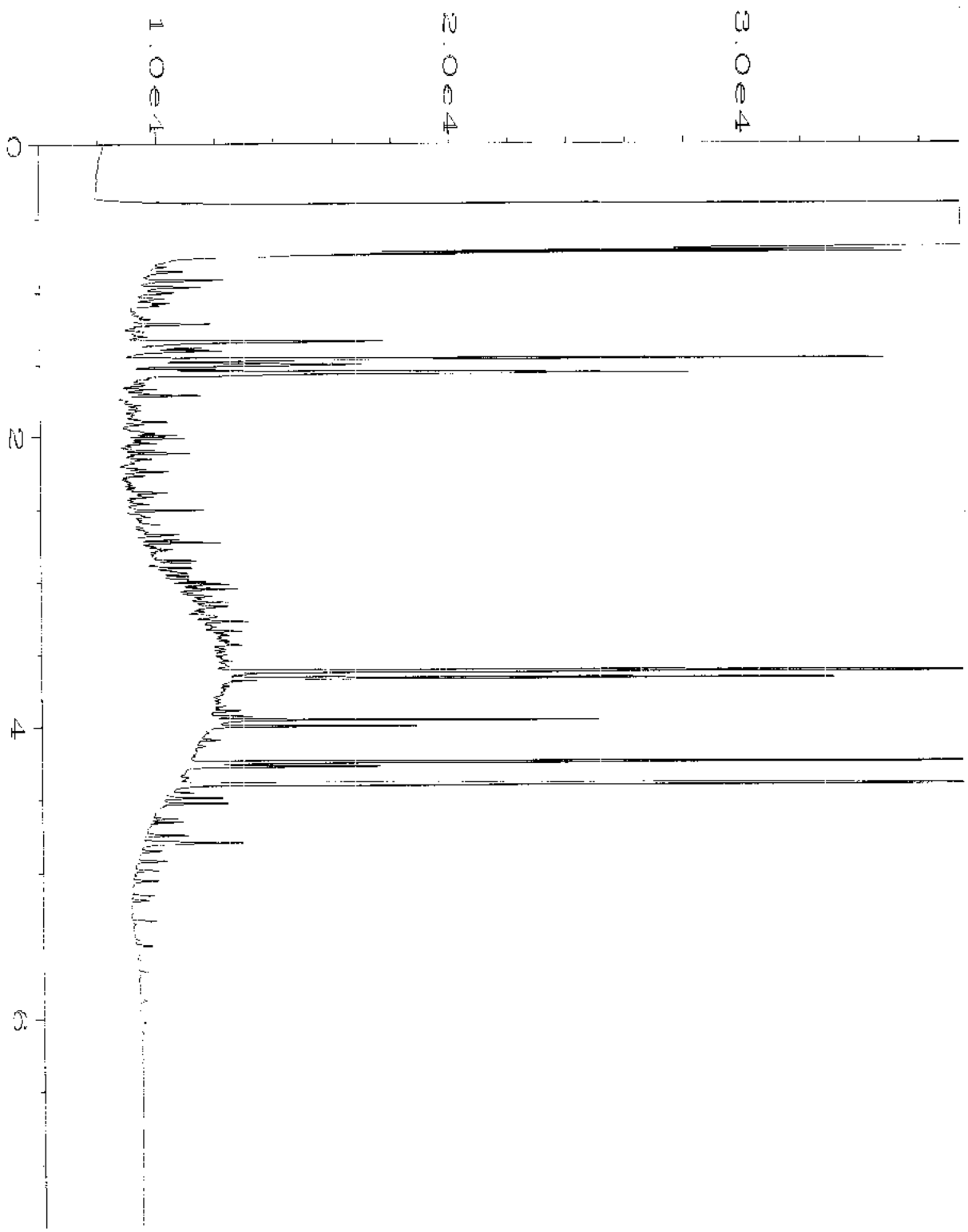
Report Created on	: 09 May 19 11:17 AM	Analysis Method	: DX.MTH



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Instrument	: GC1	Vial Number	: 38
Sample Name	: 905052-02	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 16
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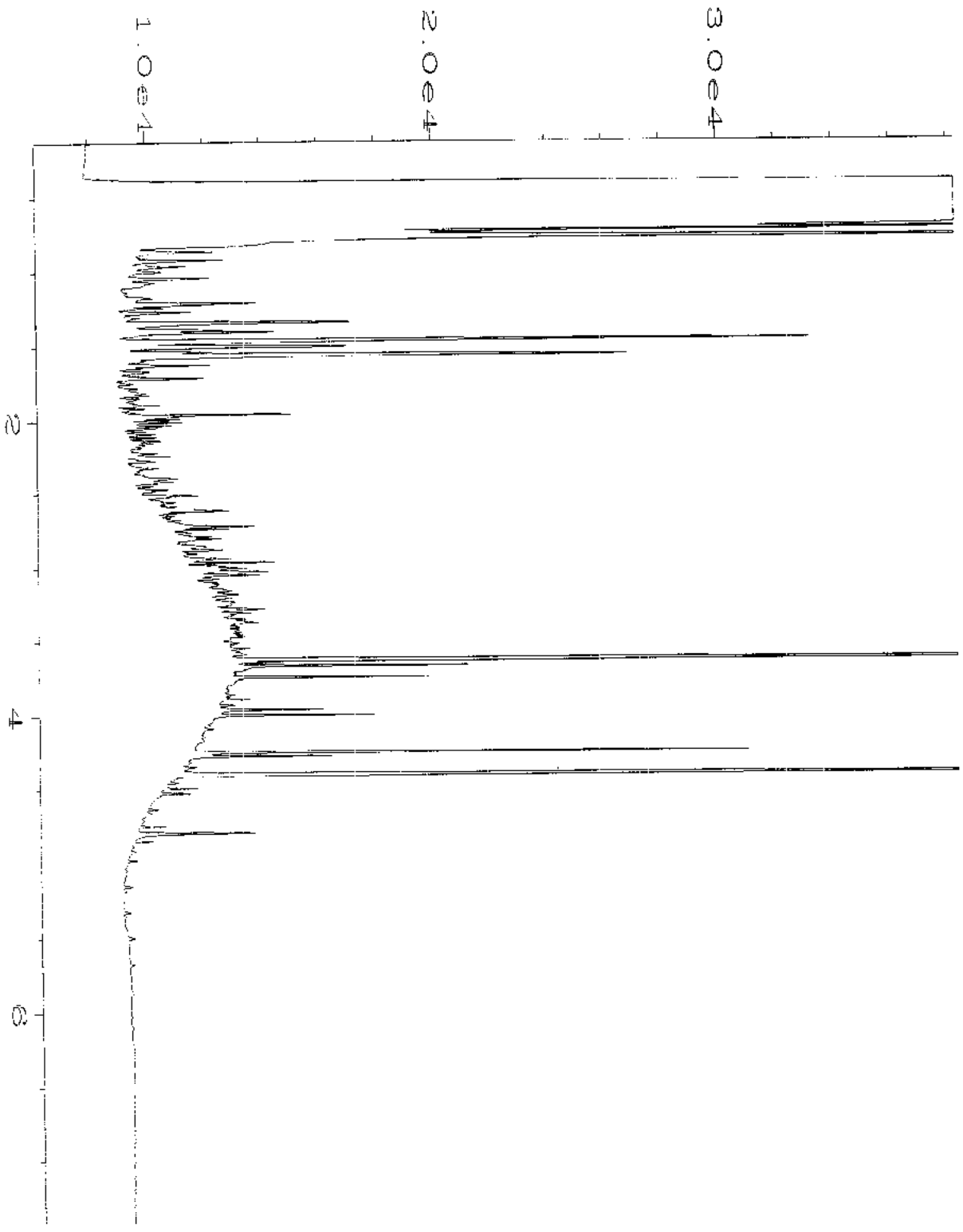
Report Created on	: 09 May 19 11:17 AM	Analysis Method	: DX.MTH



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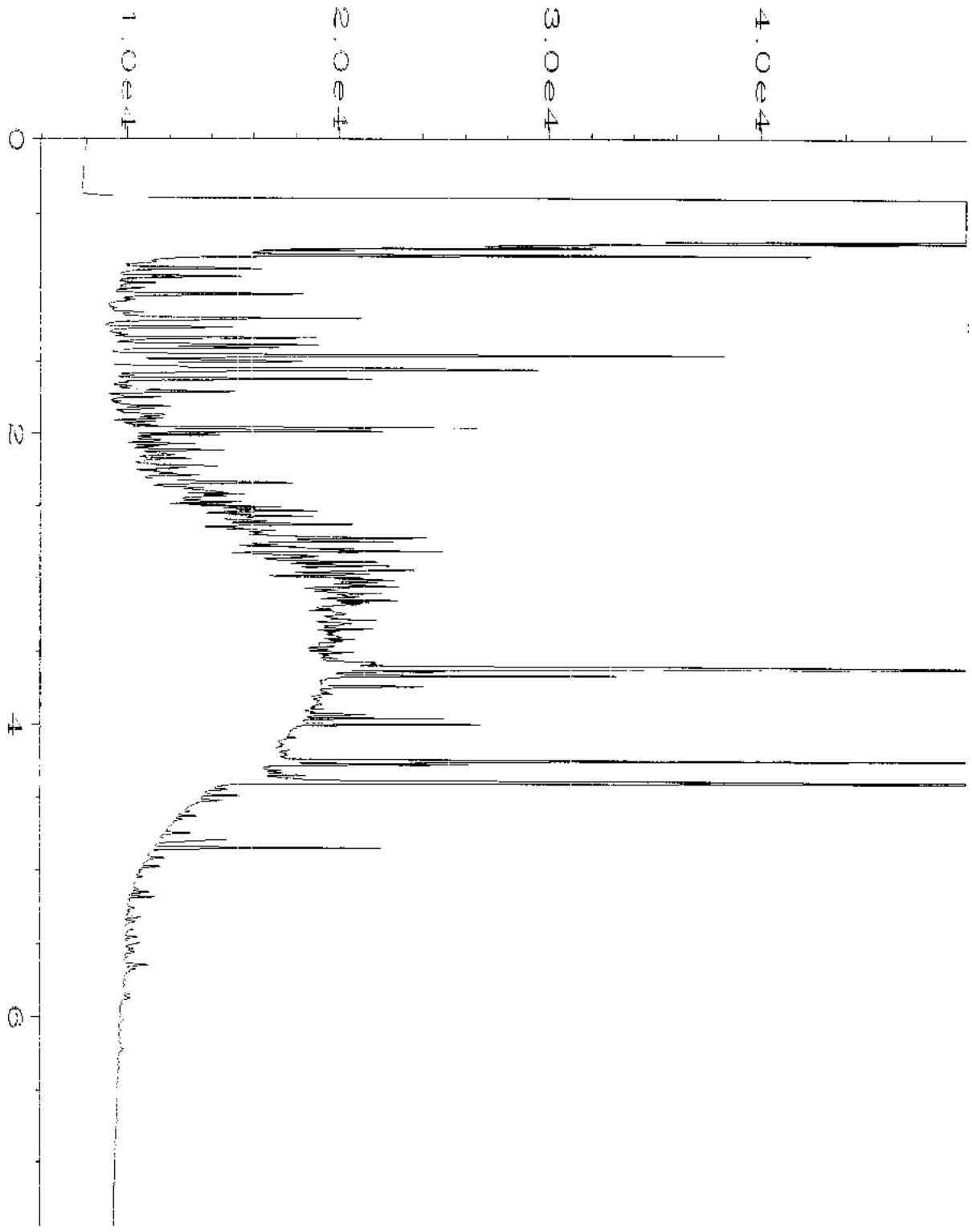
Operator : TL
Instrument : GC1
Sample Name : 905052-03
Run Time Bar Code:
Acquired on : 08 May 19 09:30 PM
Report Created on: 09 May 19 11:18 AM

Page Number : 1
Vial Number : 39
Injection Number : 1
Sequence Line : 16
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 40
Sample Name	: 905052-04	Injection Number	: 1
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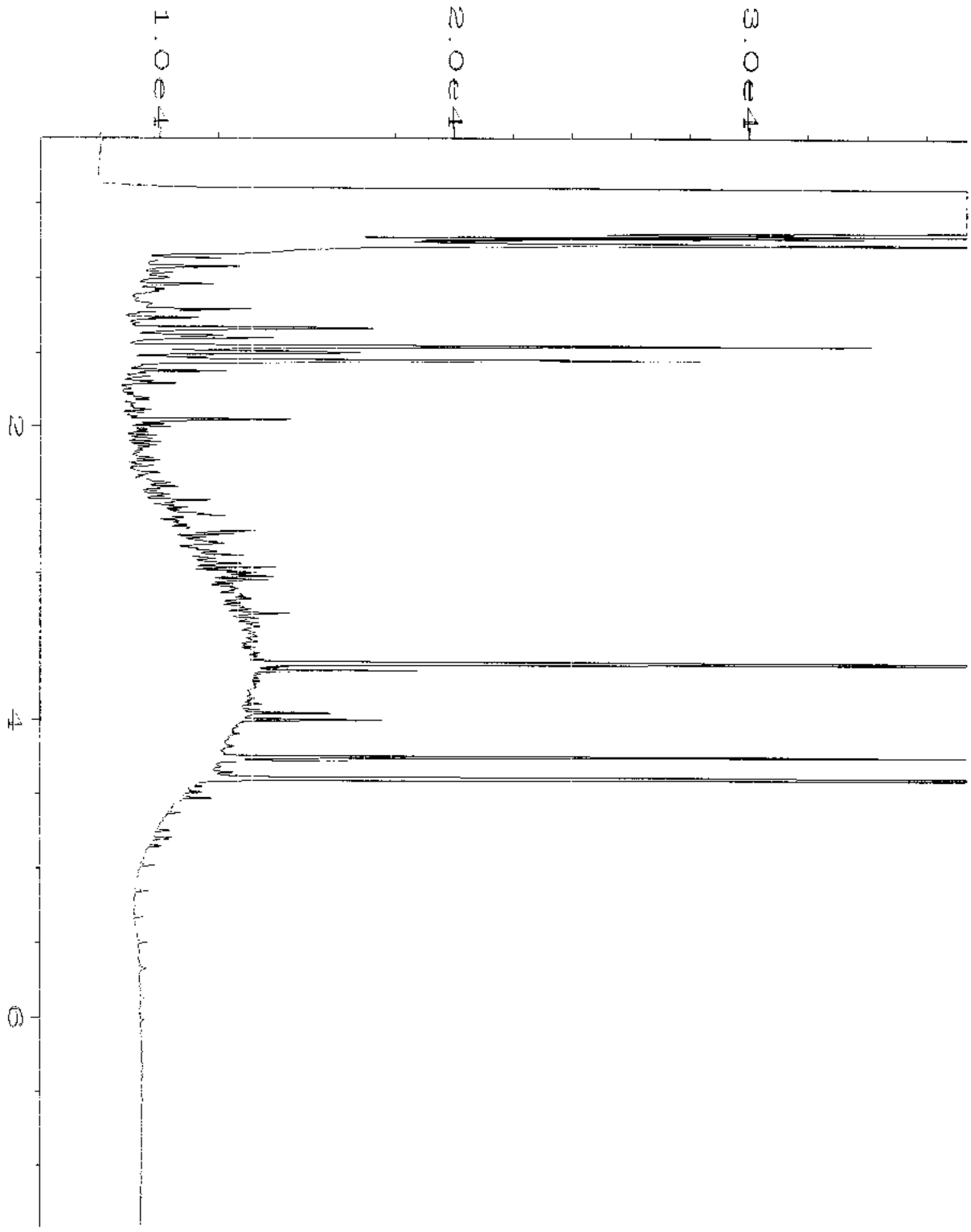

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Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 41
Sample Name	: 905052-05	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 16
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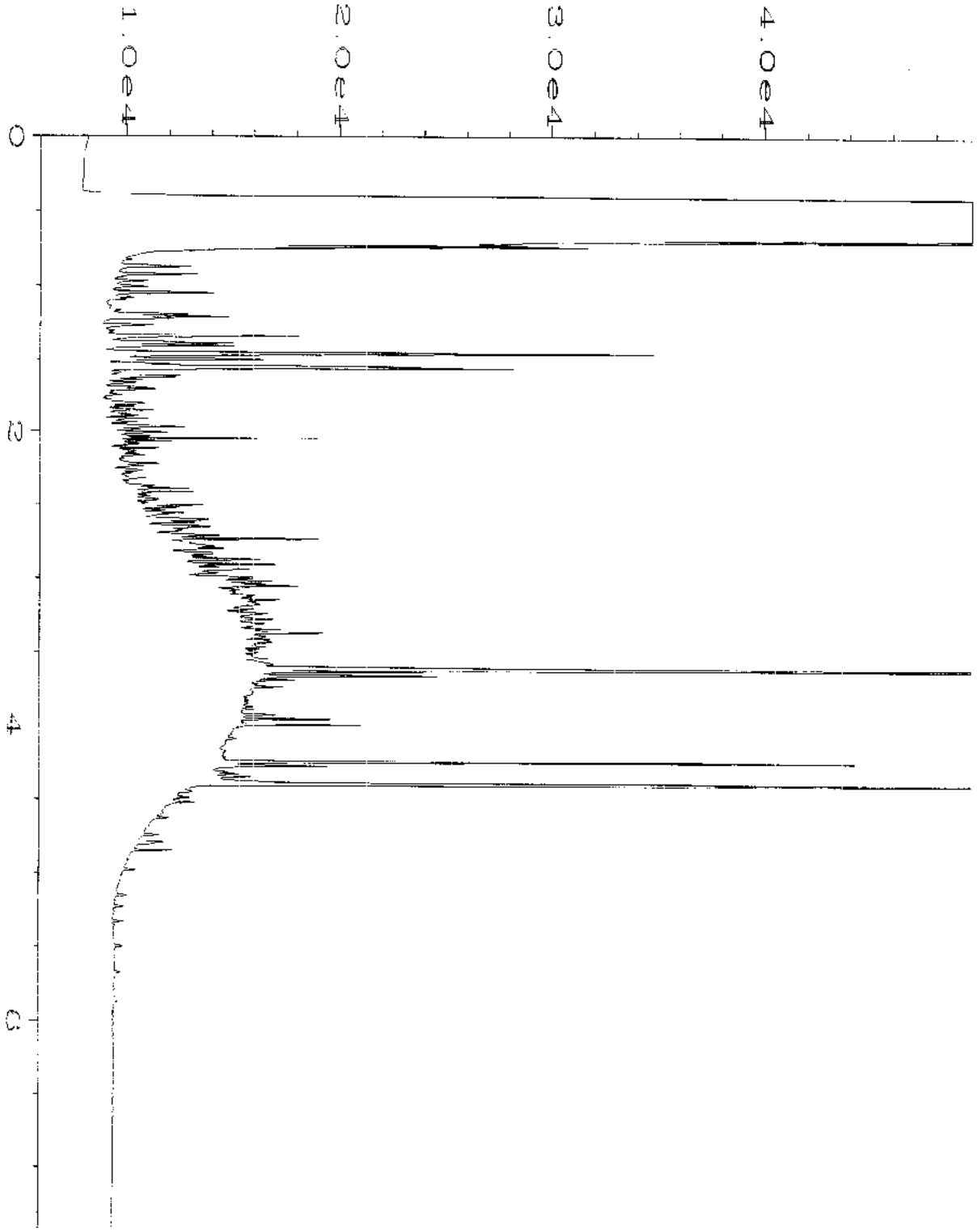

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Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 42
Sample Name	: 905052-06	Injection Number	: 1
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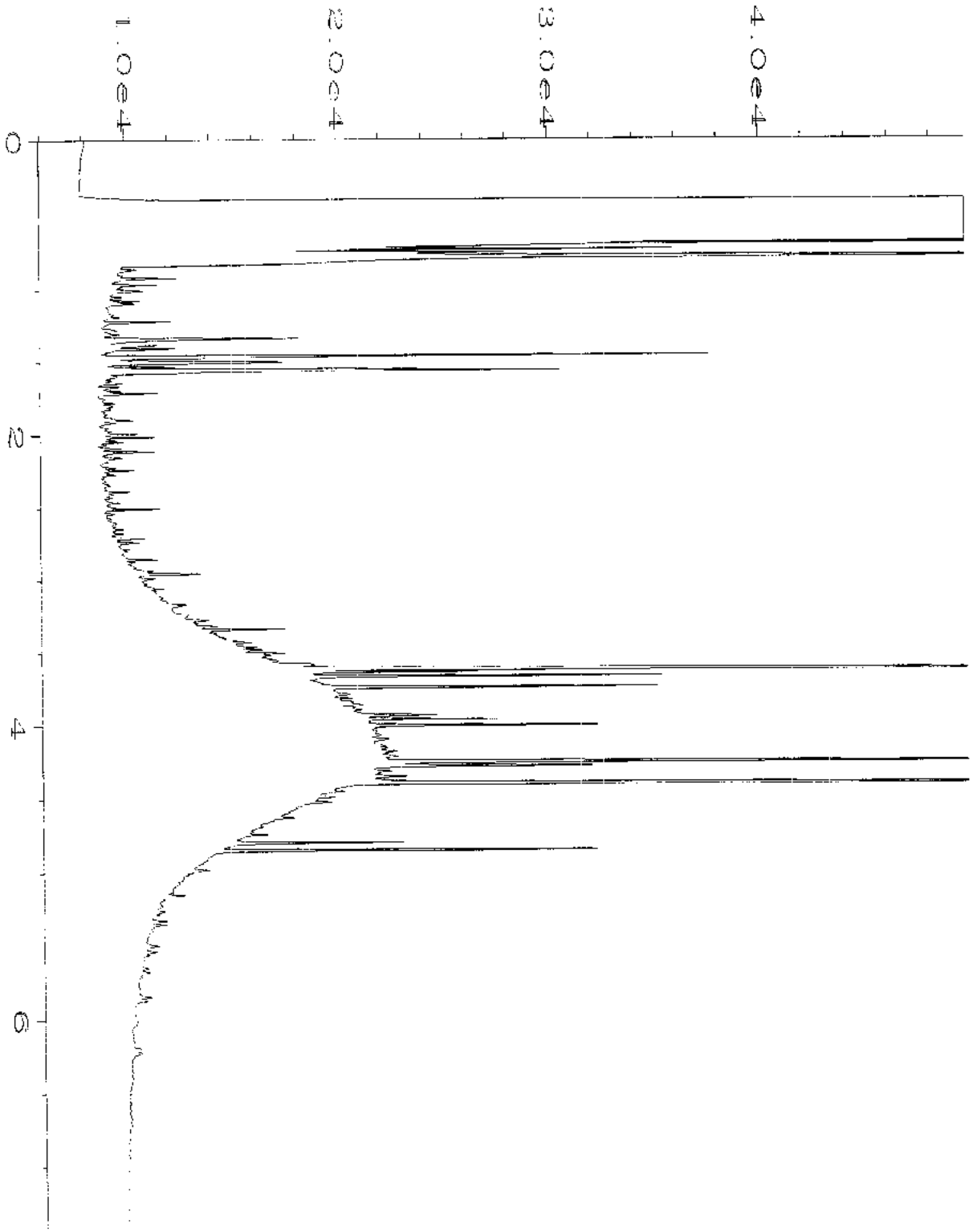
Acquired on	: 08 May 19 10:04 PM	Instrument Method	: DX.MTH
Report Created on	: 09 May 19 11:25 AM	Analysis Method	: DX.MTH



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Operator : TL
Instrument : GC1
Sample Name : 905052-07
Run Time Bar Code:
Acquired on : 08 May 19 10:15 PM
Report Created on: 09 May 19 11:25 AM

Page Number : 1
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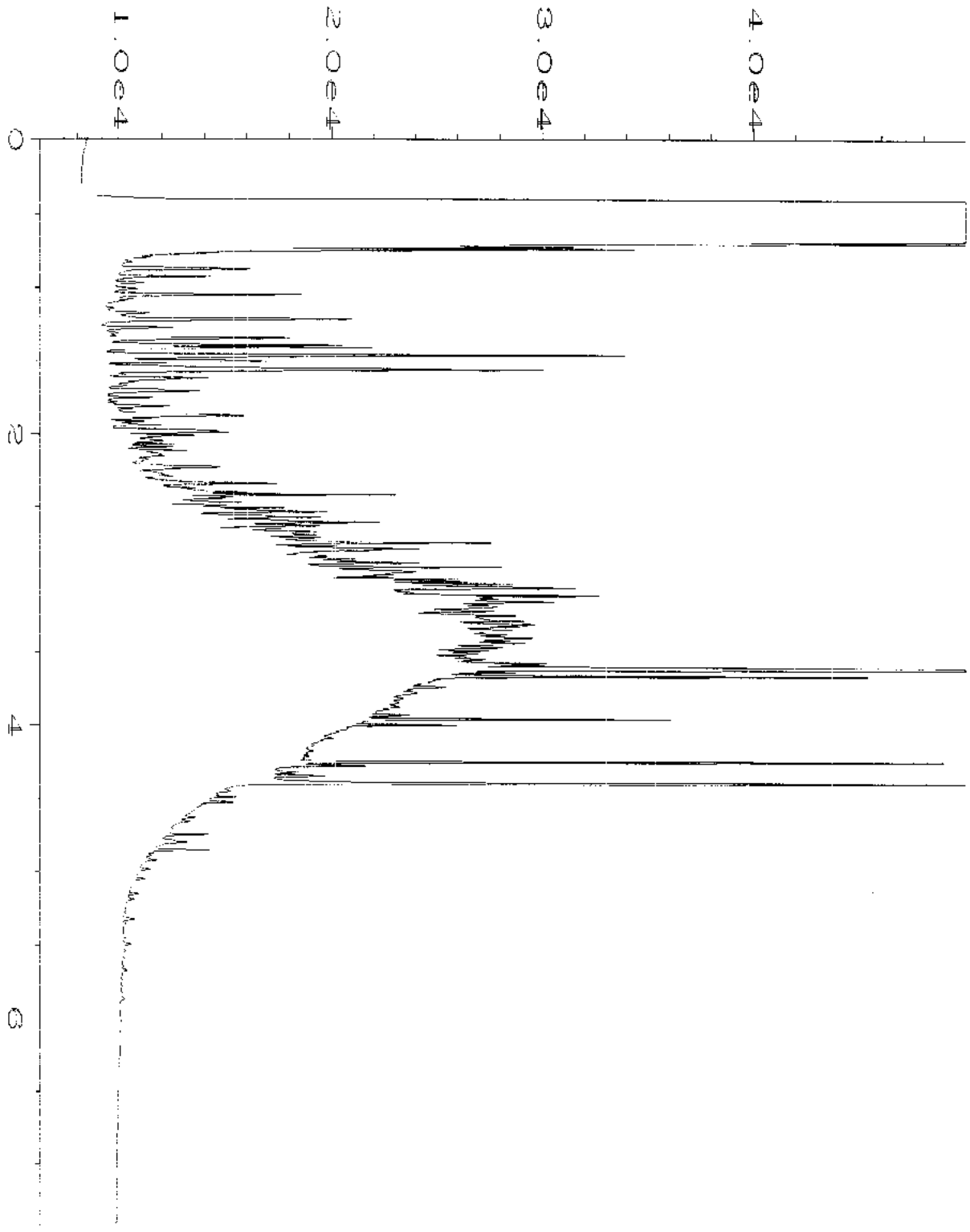
Sequence Line : 16
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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Sample Name	: 905052-08	Injection Number	: 1
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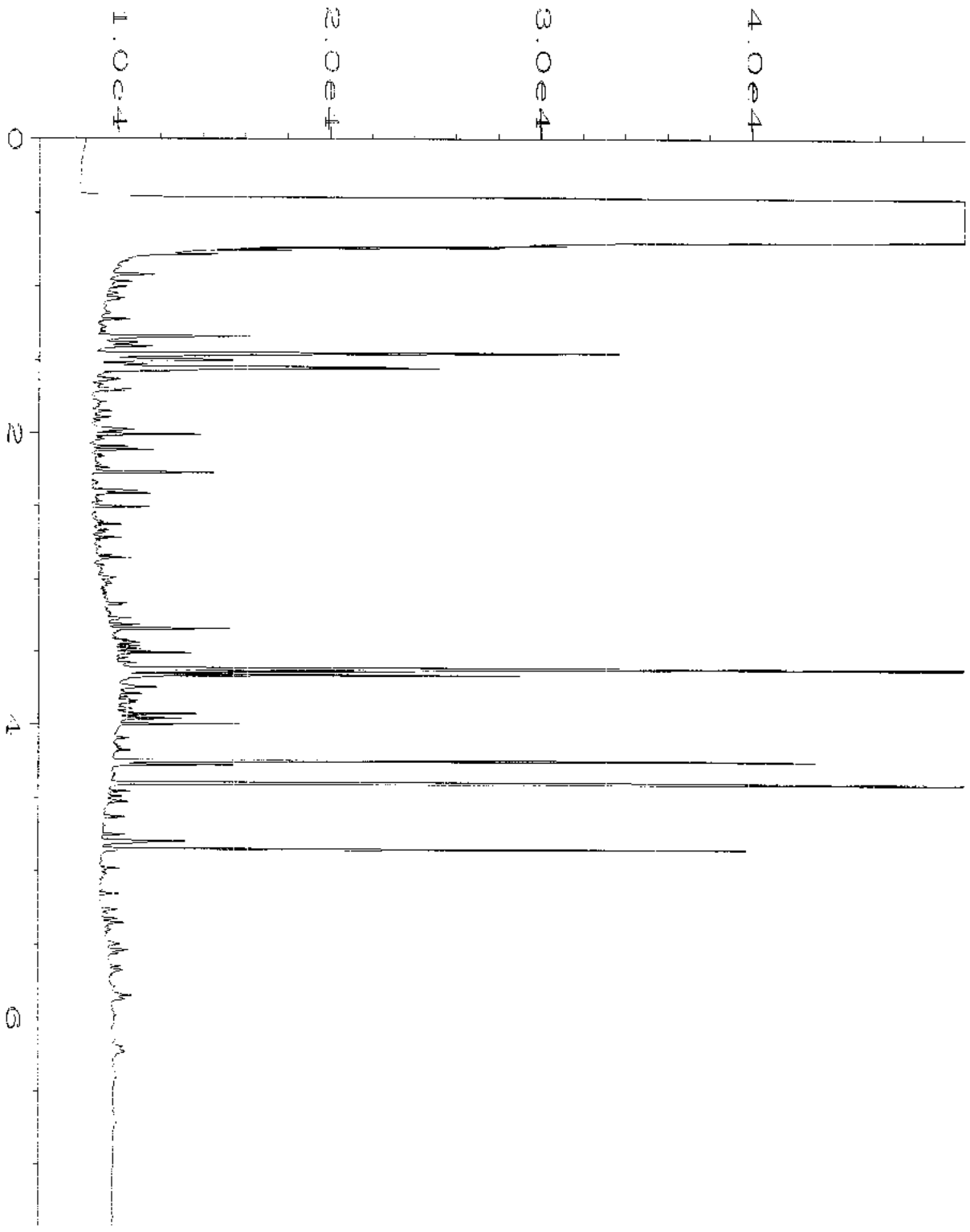

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Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 45
Sample Name	: 905052-09	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 16
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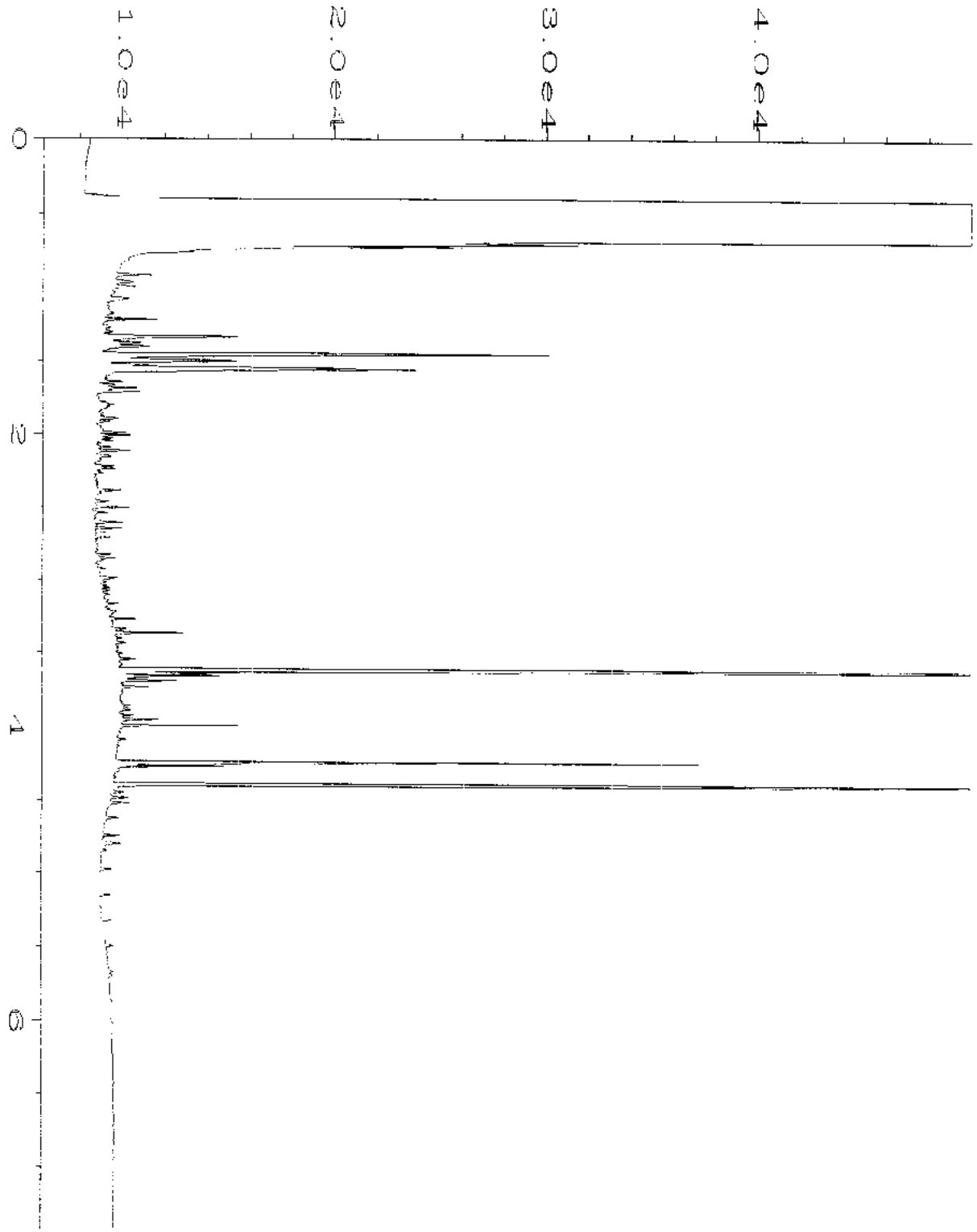
Report Created on	: 09 May 19 11:26 AM	Analysis Method	: DX.MTH



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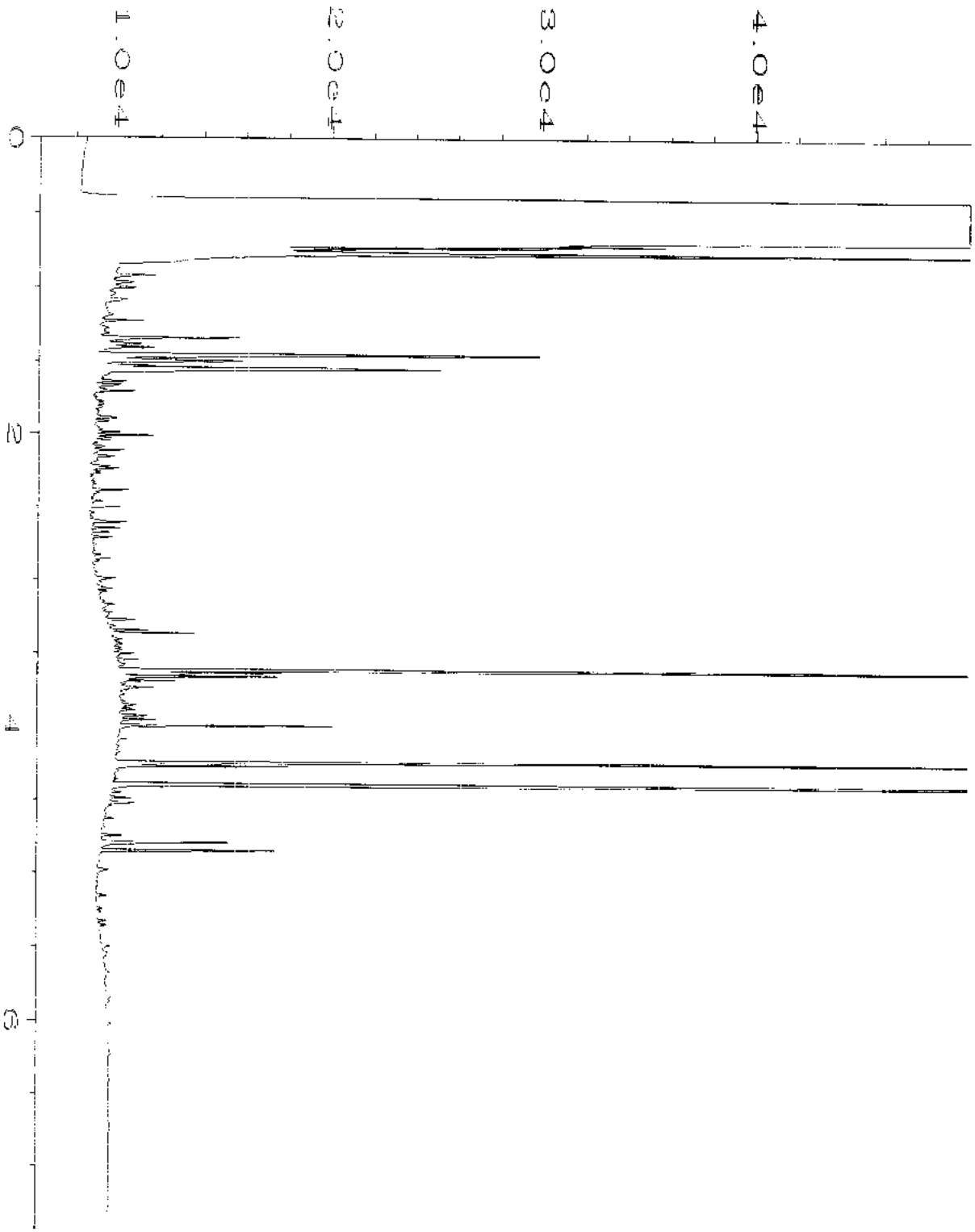
Operator : TL
Instrument : GC1
Sample Name : 905052-10
Run Time Bar Code:
Acquired on : 08 May 19 10:49 PM
Report Created on: 09 May 19 11:26 AM

Page Number : 1
Vial Number : 46
Injection Number : 1
Sequence Line : 16
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 47
Sample Name	: 905052-11	Injection Number	: 1
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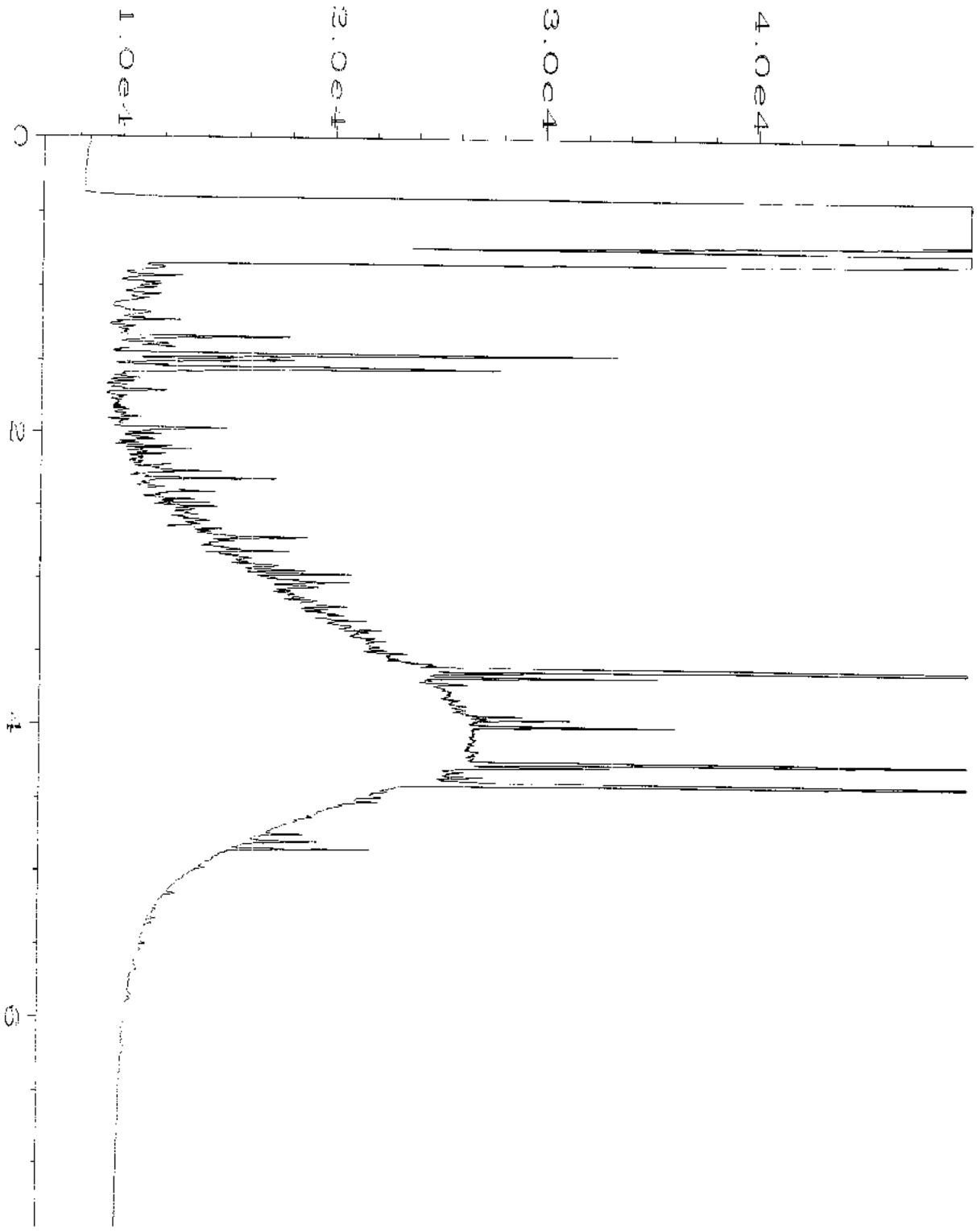

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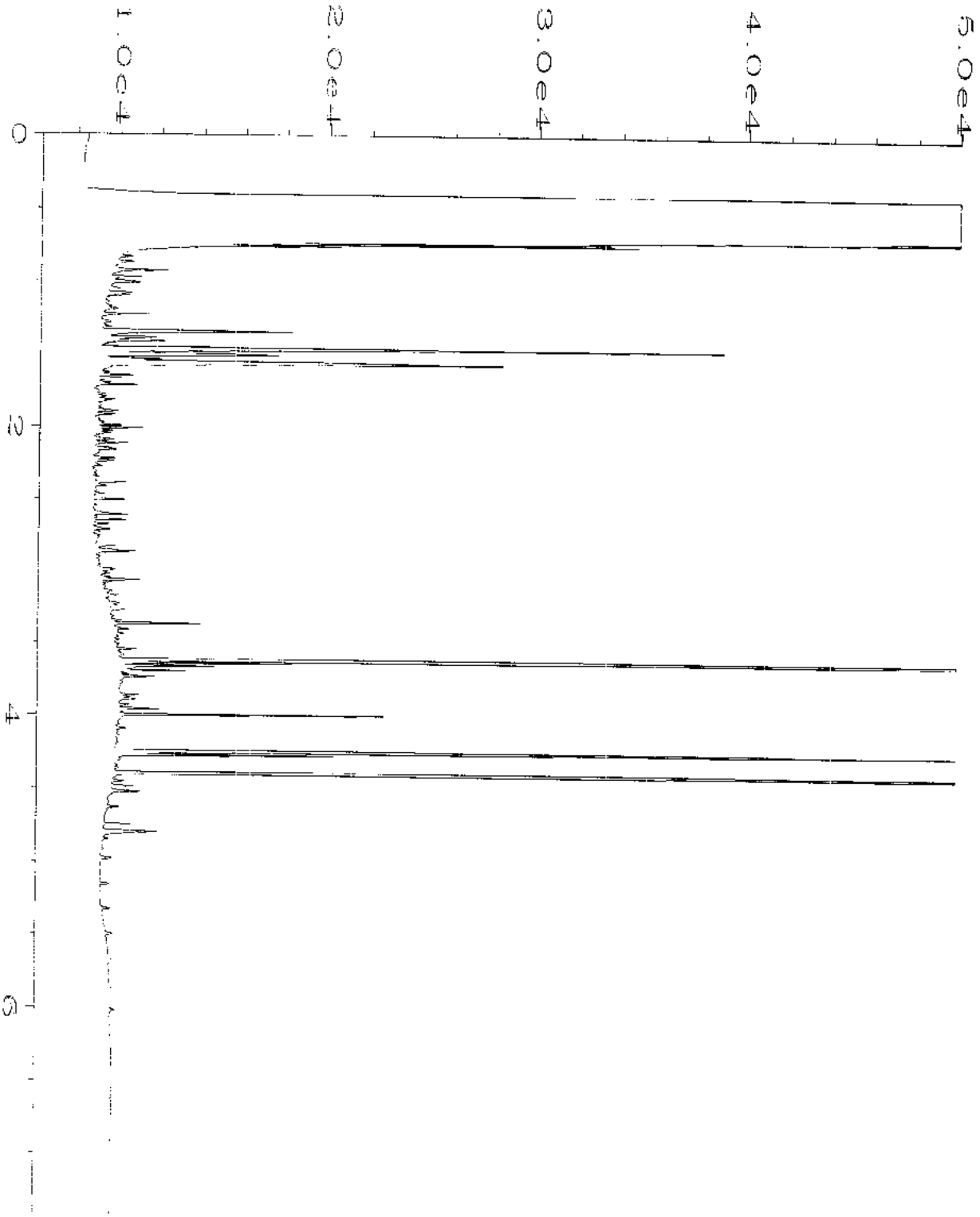
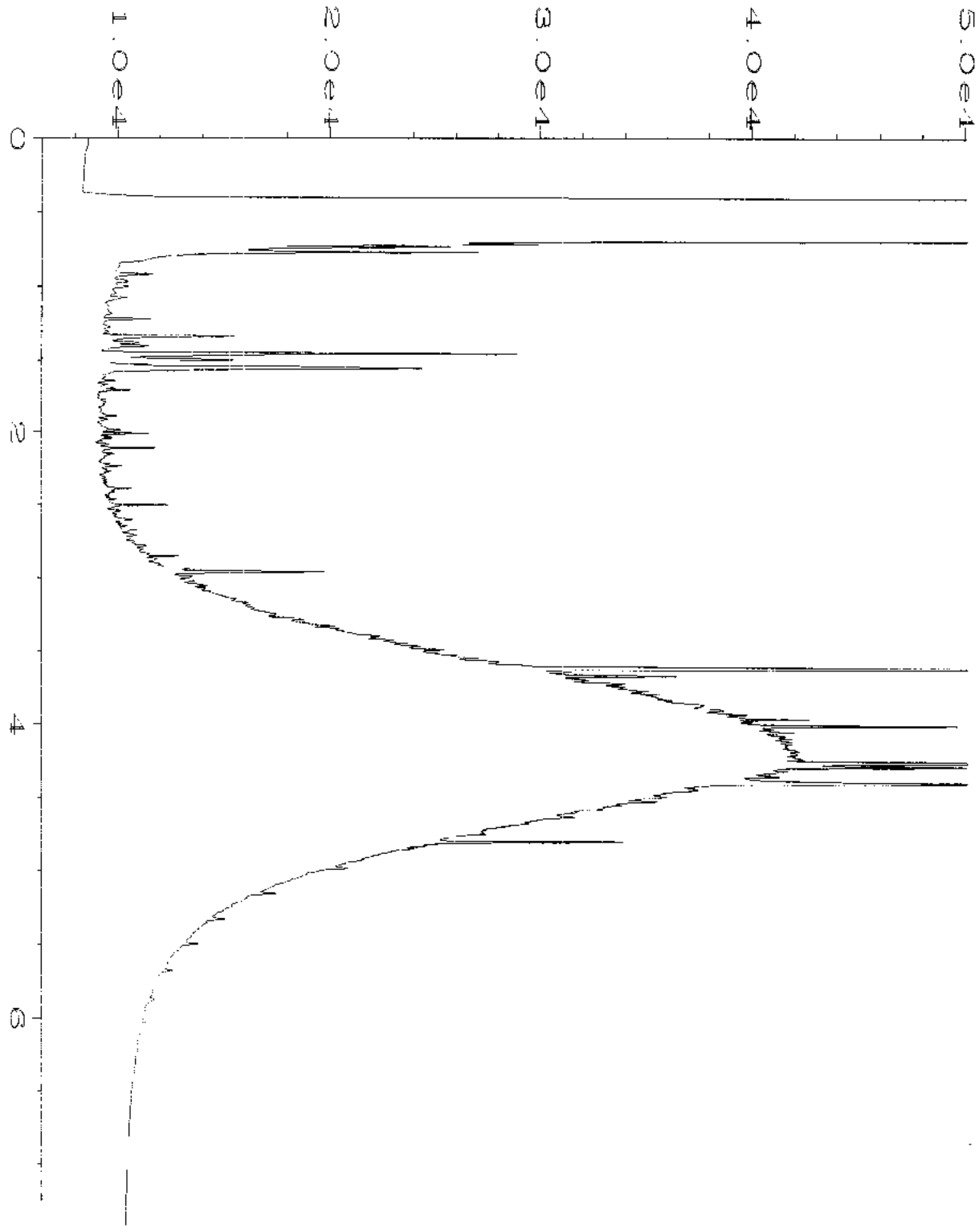
Operator : TL
Instrument : GC1
Sample Name : 905052-12
Run Time Bar Code:
Acquired on : 08 May 19 11:12 PM
Report Created on: 09 May 19 11:26 AM

Page Number : 1
Vial Number : 48
Injection Number : 1
Sequence Line : 16
Instrument Method: DX.MTH
Analysis Method : DX.MTH



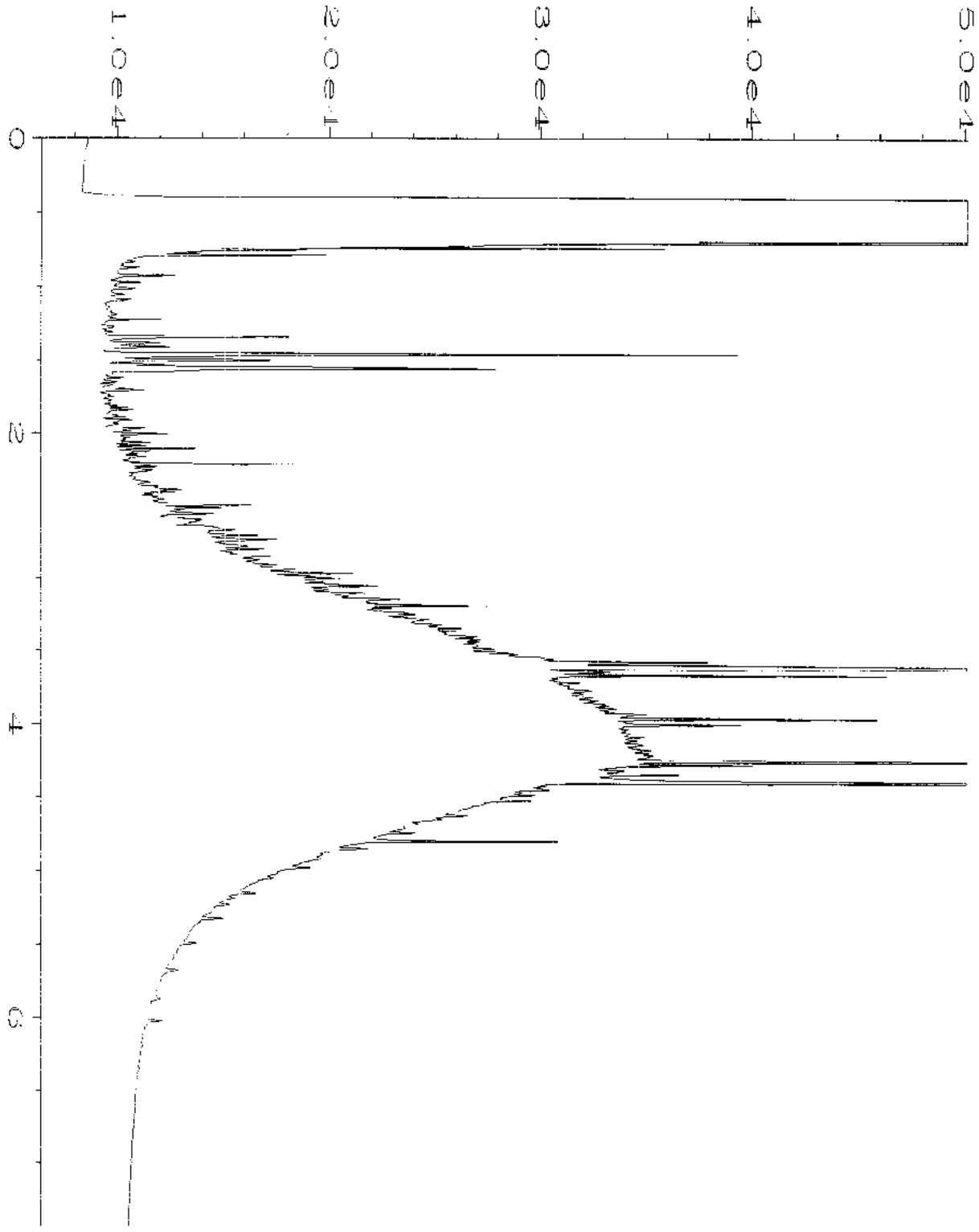
Data File Name : C:\HPCHEM\1\DATA\05-08-19\049F1601.D
Operator : TL
Instrument : GC1
Sample Name : 905052-13
Run Time Bar Code:
Acquired on : 08 May 19 11:23 PM
Report Created on: 09 May 19 11:26 AM

Page Number : 1
Vial Number : 49
Injection Number : 1
Sequence Line : 16
Instrument Method: DX.MTH
Analysis Method : DX.MTH

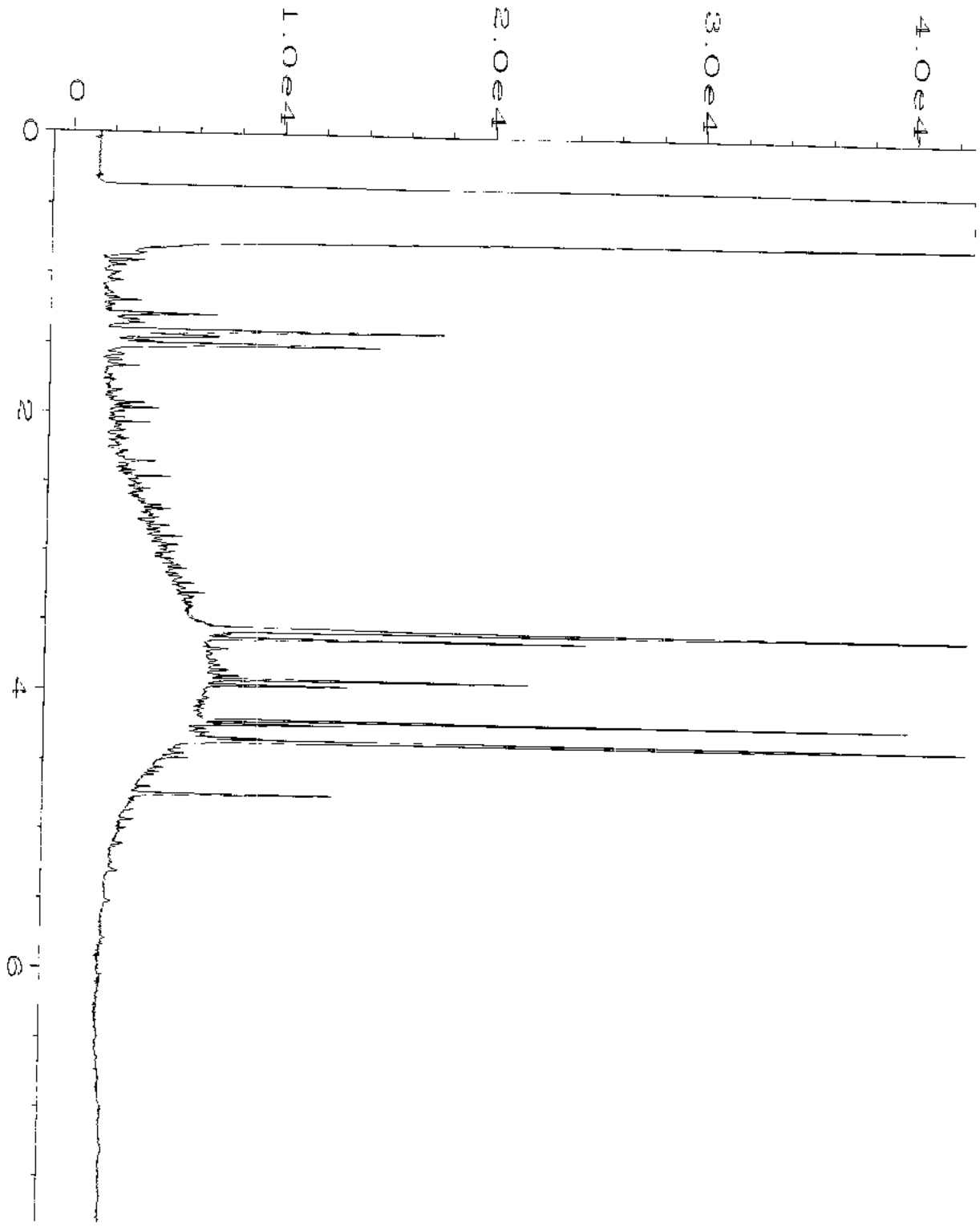


Data File Name : C:\HPCHEM\1\DATA\05-08-19\050F1601.D

Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 50
Sample Name	: 905052-14	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 16
Acquired on	: 08 May 19 11:35 PM	Instrument Method	: DX.MTH
Report Created on	: 09 May 19 11:26 AM	Analysis Method	: DX.MTH

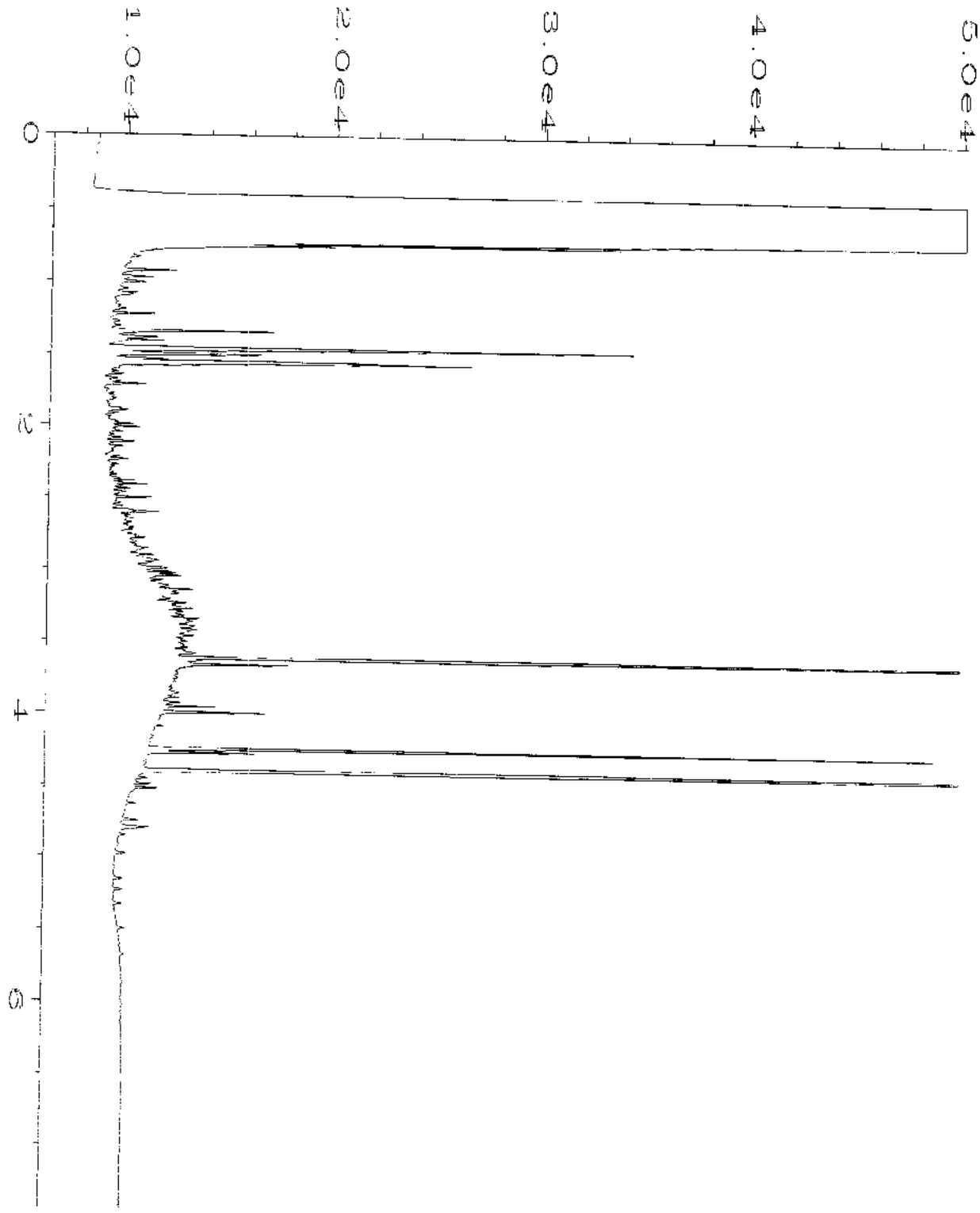


Data File Name	: C:\HPCHEM\1\DATA\05-08-19\051F1601.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 51
Sample Name	: 905052-17	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 16
Acquired on	: 08 May 19 11:46 PM	Instrument Method	: DX.MTH
Report Created on:	09 May 19 11:26 AM	Analysis Method	: DX.MTH



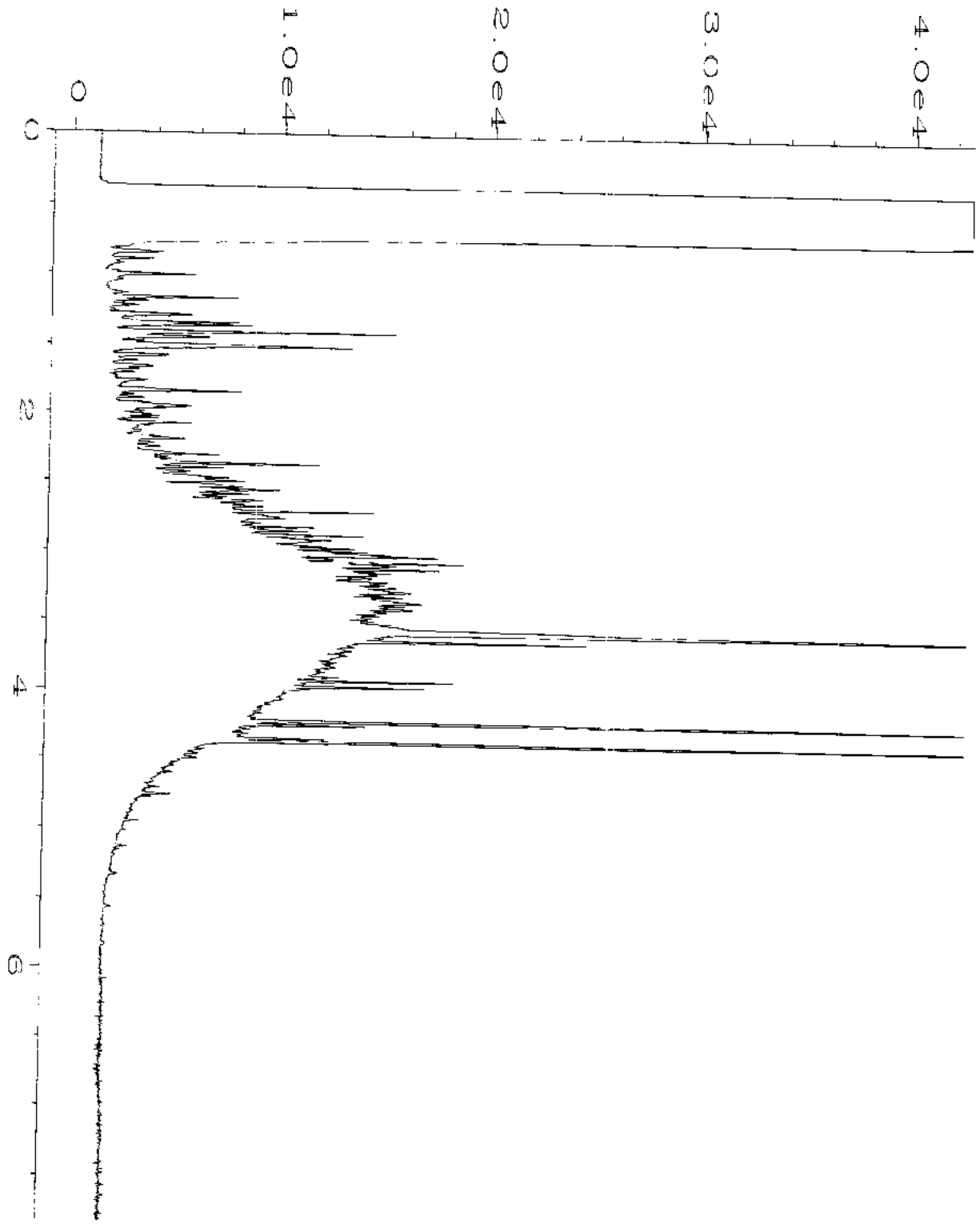
Data File Name : C:\HPCHEM\4\DATA\05-09-19\082F0701.D
Operator : TL
Instrument : GC#4
Sample Name : 905052-18 ✓ 05.09.19
Run Time Bar Code:
Acquired on : 09 May 19 02:05 PM
Report Created on: 09 May 19 03:05 PM

Page Number : 1
Vial Number : 82
Injection Number : 1
Sequence Line : 7
Instrument Method: DX.MTH
Analysis Method : DX.MTH



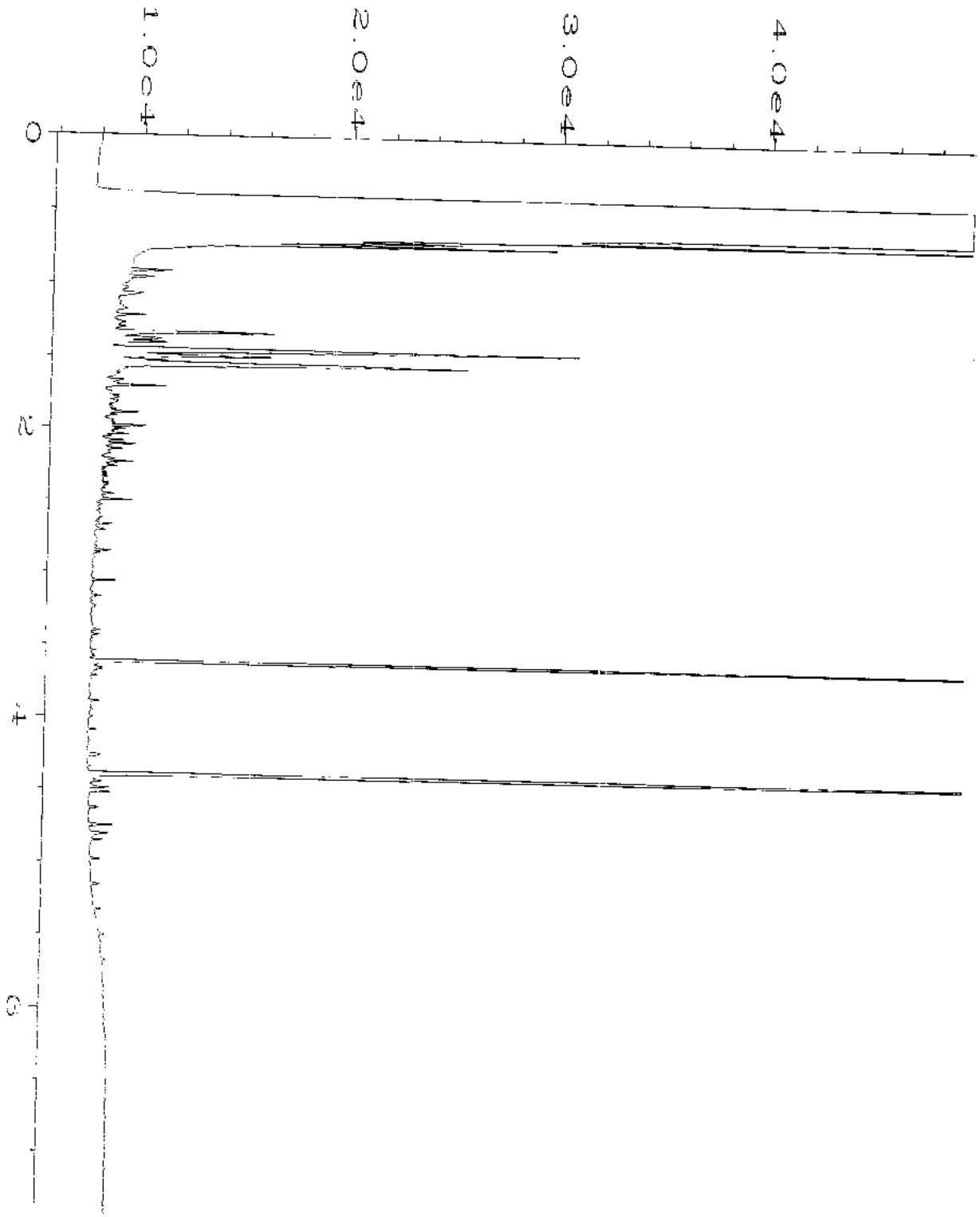
Data File Name : C:\HPCHEM\1\DATA\05-08-19\053F1601.D
Operator : TL
Instrument : GC1
Sample Name : 905052-19
Run Time Bar Code:
Acquired on : 09 May 19 00:08 AM
Report Created on: 09 May 19 11:27 AM

Page Number : 1
Vial Number : 53
Injection Number : 1
Sequence Line : 16
Instrument Method: DX.MTH
Analysis Method : DX.MTH



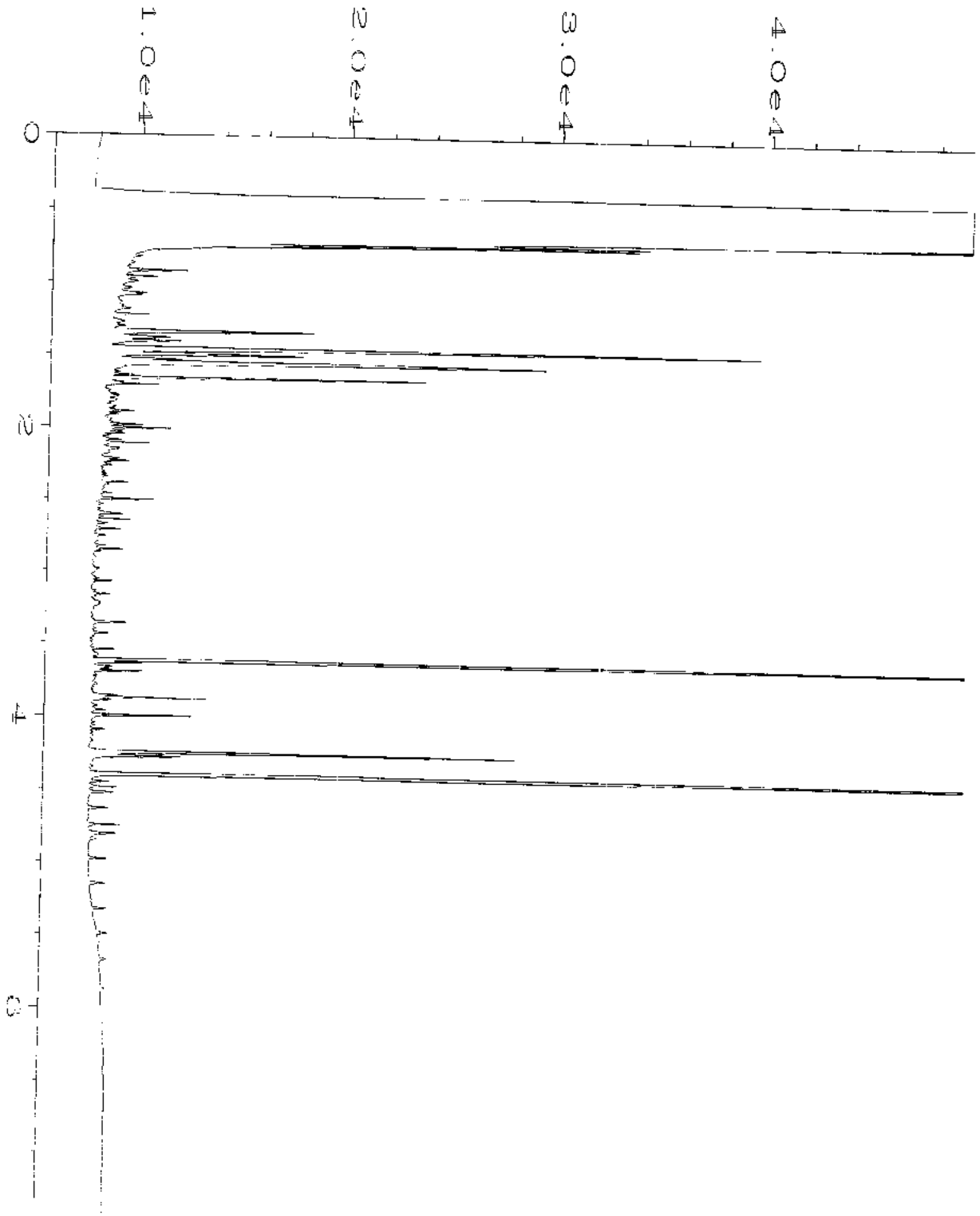
Data File Name : C:\HPCHEM\4\DATA\05-09-19\083F0701.D
Operator : TL
Instrument : GC#4
Sample Name : 905052-20 TC 05-09-19
Run Time Bar Code:
Acquired on : 09 May 19 02:17 PM
Report Created on: 09 May 19 03:07 PM

Page Number : 1
Vial Number : 83
Injection Number : 1
Sequence Line : 7
Instrument Method: DX.MTH
Analysis Method : DX.MTH



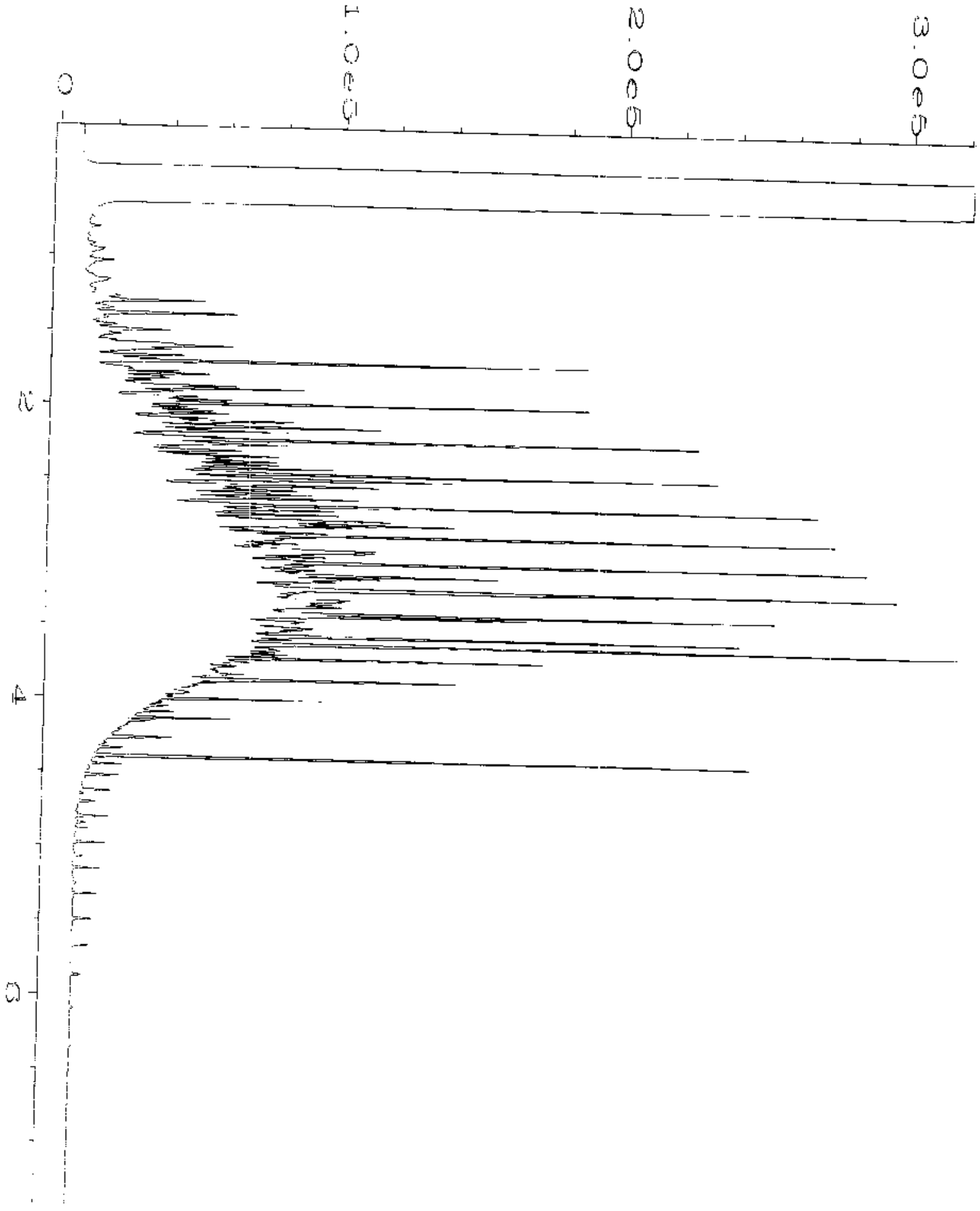
Data File Name : C:\HPCHEM\1\DATA\05-08-19\033F1601.D
Operator : TL
Instrument : GC1
Sample Name : 09-1062 mb
Run Time Bar Code:
Acquired on : 08 May 19 08:22 PM
Report Created on: 09 May 19 11:27 AM

Page Number : 1
Vial Number : 33
Injection Number : 1
Sequence Line : 16
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\1\DATA\05-08-19\036F1601.D
Operator : TL
Instrument : GC1
Sample Name : 09-1062 mb2
Run Time Bar Code:
Acquired on : 08 May 19 08:56 PM
Report Created on: 09 May 19 11:32 AM

Page Number : 1
Vial Number : 36
Injection Number : 1
Sequence Line : 16
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\1\DATA\05-08-19\005F1501.D
Operator : TL
Instrument : GC1
Sample Name : 1000 Dx 57-31B
Run Time Bar Code:
Acquired on : 08 May 19 08:10 PM
Report Created on: 09 May 19 11:28 AM

Page Number : 1
Vial Number : 5
Injection Number : 1
Sequence Line : 15
Instrument Method: DX.MTH
Analysis Method : DX.MTH

905052

SAMPLE CHAIN OF CUSTODY

ME 05-02-19

Page # 1 of 2 Day/HWS

Report To Lynn Grochala
Company Floyd Snider
Address 601 Union St, Ste 600
City, State, ZIP Seattle, WA 98101
Phone 206-292-2078 Email lynn.grochala@floydsnider.com

SAMPLERS (*signature*)

PROJECT NAME: Cantera - TOC

PO #

REMARKS: analyze TB for TPH/6+ BTEX

INVOICE TO

TURNAROUND TIME
- [x] Standard Turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Archive Samples
- [ ] Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	CVOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	CVOCs + BTEX 8260				Notes
01MW07	01 A-D		1640	W	4		X						X				
01MW15	02 A-G		1310		7		X	X					X				
01MW44	03		1435		7		X	X					X				
01MW45	04		1535		7		X	X					X				
01MW46	05 A-D		1534		4		X						X				
01MW53	06		1535		4		X		[redacted]	KA			X				lab centrifuge
01MW55	07 A-G		1305		7		X	X					X				
01MW56	08 A-D		1450		4		X						X				
01MW58	09		1345		4		X			X							
01MW60	10		1426		4		X			X							lab centrifuge

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Layni Wachter	Layni Wachter	FloydSnider	05/02/19	18:01
Received by: D. M-B	Liz Webber-Bruya	FSB	5/2/19	1801
Relinquished by:				
Received by:		Samples received at 3 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

905052

SAMPLE CHAIN OF CUSTODY

ME 06-02-19

Page # 2 of 2 DOH

Report To Lynn Grochala

Company Floyd | Snider

Address (see p 1)

City, State, ZIP

Phone Email

SAMPLERS (signature)

PROJECT NAME: Cantera - TOC

PO #

REMARKS

INVOICE TO

TURNAROUND TIME
- [x] Standard Turnaround VW 5
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Archive Samples
- [ ] Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	CVOCs by 8260C	SVOCs by 8270D	SIM PAHs 8270D-SIM (VPH+EPH Targets)	cVOCs + BTEX 8260	VPH+Targets	EPH+Targets	PAHs (EPH Targets)	Notes
01 MW62	11 A-G	5/2/19	~~1058~~ ~~5/2/19~~	W	7		X	X					X				lab centrifuge
01 MW63	12		1110		7		X	X					X				
01 MW64	13		1555		1		X										lab centrifuge
01 MW70	14 A-G		1120		7		X	X		X							
01 MW71	15 A-H		1050		8					X		X		X	X	X	
01 MW78	16 A-C		1240		3					X							lab centrifuge
01 MW79	17 A-G		1255		7		X	X		X							
01 MW80	18 A-D		1635		4		X						X				
01 MW89	19		1648		1		X										
01 MW580	20 A-D		1700		4		X						X				
Trip Blank	21 A-C																

* Added in Lab on 5/3

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Layni Wachter	Layni Wachter	Floyd|Snider	05/2/19	18:01
Received by: O. M - Bruya	Liz Webber - Bruya	FIBI	5/2/19	1801
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 22, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included is the amended report from the testing of material submitted on May 3, 2019 from the Cantera-TOC, F&BI 905079 project. The 8260 TCE reporting limit was lowered and 8270D 1- and 2-methylnaphthalene were added.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0523R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
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fbi@isomedia.com
www.friedmanandbruya.com

May 23, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on May 3, 2019 from the Cantera-TOC, F&BI 905079 project. There are 32 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0523R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on May 3, 2019 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera-TOC, F&BI 905079 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
905079 -01	01MW77-050319
905079 -02	01MW85-050319
905079 -03	01MW106-050319
905079 -04	01MW108-050319
905079 -05	Trip Blanks-050319
905079 -06	MW01-050319
905079 -07	MW02-050319
905079 -08	MW102-050319
905079 -09	MW03-050319
905079 -10	MW04-050319
905079 -11	MW05-050319
905079 -12	MW06-050319
905079 -13	01MW54-050319
905079 -14	01MW65-050319
905079 -15	01MW76-050319

Sample MW03-050319 was analyzed outside of holding time. The data were flagged accordingly.

All other quality control requirements were acceptable.

Date of Report: 05/23/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905079
Date Extracted: 05/08/19
Date Analyzed: 05/08/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
MW05-050319 905079-11	140	106
Method Blank 09-836 mb	<100	107

Date of Report: 05/23/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905079
Date Extracted: 05/08/19
Date Analyzed: 05/08/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
Trip Blanks-050319 905079-05	<1	<1	<1	<3	<100	86
Method Blank 09-836 mb	<1	<1	<1	<3	<100	85

Date of Report: 05/23/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905079
Date Extracted: 05/09/19
Date Analyzed: 05/09/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 47-140)
01MW85-050319 905079-02	450 x	<250	97
MW05-050319 905079-11	310 x	<250	103
MW06-050319 905079-12	370 x	<260	123
01MW76-050319 905079-15	150 x	<250	110
Method Blank 09-1079 MB	<50	<250	86

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW03-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/07/19	Lab ID:	905079-09
Date Analyzed:	05/07/19	Data File:	905079-09.077
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	66.1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	NA	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/07/19	Lab ID:	I9-298 mb
Date Analyzed:	05/07/19	Data File:	I9-298 mb.061
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	MW03-050319 ht	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/21/19	Lab ID:	905079-09 1/2
Date Analyzed:	05/21/19	Data File:	052126.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	100	31	160
Benzo(a)anthracene-d12	102	25	165

Naphthalene	<0.4
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.04
1-Methylnaphthalene	<0.4
2-Methylnaphthalene	<0.4

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/21/19	Lab ID:	09-1184 mb
Date Analyzed:	05/21/19	Data File:	052121.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	89	31	160
Benzo(a)anthracene-d12	90	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.2
Acenaphthylene	<0.02
Acenaphthene	<0.02
Fluorene	<0.02
Phenanthrene	<0.02
Anthracene	<0.02
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.02
1-Methylnaphthalene	<0.2
2-Methylnaphthalene	<0.2

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW77-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	905079-01
Date Analyzed:	05/10/19	Data File:	051009.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	87	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW85-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	905079-02
Date Analyzed:	05/10/19	Data File:	051011.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	102	50	150
4-Bromofluorobenzene	89	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	7.9
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	2.4
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW106-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	905079-03
Date Analyzed:	05/10/19	Data File:	051010.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	50	150
Toluene-d8	96	50	150
4-Bromofluorobenzene	84	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW108-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	905079-04
Date Analyzed:	05/10/19	Data File:	051012.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	50	150
Toluene-d8	102	50	150
4-Bromofluorobenzene	90	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.33
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW01-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	905079-06
Date Analyzed:	05/10/19	Data File:	051013.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	50	150
Toluene-d8	102	50	150
4-Bromofluorobenzene	89	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW02-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	905079-07
Date Analyzed:	05/10/19	Data File:	051014.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	50	150
Toluene-d8	102	50	150
4-Bromofluorobenzene	89	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW102-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	905079-08
Date Analyzed:	05/10/19	Data File:	051015.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	50	150
Toluene-d8	102	50	150
4-Bromofluorobenzene	90	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW03-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	905079-09
Date Analyzed:	05/10/19	Data File:	051016.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	102	50	150
4-Bromofluorobenzene	93	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.72
Chloroethane	<1
1,1-Dichloroethene	<1
Hexane	<1
Methylene chloride	<5
Methyl t-butyl ether (MTBE)	<1
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	8.6
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
1,2-Dibromoethane (EDB)	<1
Benzene	2.1
Trichloroethene	<0.5
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW04-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	905079-10
Date Analyzed:	05/10/19	Data File:	051023.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	104	50	150
4-Bromofluorobenzene	91	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	2.5
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	20
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Benzene	1.1
Trichloroethene	960 ve
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW04-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	905079-10 1/100
Date Analyzed:	05/10/19	Data File:	050969.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	85	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<20
Chloroethane	<100
1,1-Dichloroethene	<100
Methylene chloride	<500
trans-1,2-Dichloroethene	<100
1,1-Dichloroethane	<100
cis-1,2-Dichloroethene	<100
1,2-Dichloroethane (EDC)	<100
1,1,1-Trichloroethane	<100
Benzene	<35
Trichloroethene	970
Toluene	<100
Tetrachloroethene	<100
Ethylbenzene	<100
m,p-Xylene	<200
o-Xylene	<100

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW05-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	905079-11
Date Analyzed:	05/10/19	Data File:	051021.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	102	50	150
4-Bromofluorobenzene	90	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	20
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	2.4
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	110
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Benzene	1.0
Trichloroethene	210 ve
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW05-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	905079-11 1/100
Date Analyzed:	05/10/19	Data File:	050970.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	87	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	27
Chloroethane	<100
1,1-Dichloroethene	<100
Methylene chloride	<500
trans-1,2-Dichloroethene	<100
1,1-Dichloroethane	<100
cis-1,2-Dichloroethene	120
1,2-Dichloroethane (EDC)	<100
1,1,1-Trichloroethane	<100
Benzene	<35
Trichloroethene	240
Toluene	<100
Tetrachloroethene	<100
Ethylbenzene	<100
m,p-Xylene	<200
o-Xylene	<100

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW06-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	905079-12
Date Analyzed:	05/10/19	Data File:	051022.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	50	150
Toluene-d8	104	50	150
4-Bromofluorobenzene	91	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	2.8
Chloroethane	<1
1,1-Dichloroethene	1.1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	31
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Benzene	2.6
Trichloroethene	280 ve
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW06-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	905079-12 1/100
Date Analyzed:	05/10/19	Data File:	050971.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	86	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<20
Chloroethane	<100
1,1-Dichloroethene	<100
Methylene chloride	<500
trans-1,2-Dichloroethene	<100
1,1-Dichloroethane	<100
cis-1,2-Dichloroethene	<100
1,2-Dichloroethane (EDC)	<100
1,1,1-Trichloroethane	<100
Benzene	<35
Trichloroethene	330
Toluene	<100
Tetrachloroethene	<100
Ethylbenzene	<100
m,p-Xylene	<200
o-Xylene	<100

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW54-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	905079-13
Date Analyzed:	05/10/19	Data File:	051017.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	50	150
Toluene-d8	102	50	150
4-Bromofluorobenzene	90	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW65-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	905079-14
Date Analyzed:	05/10/19	Data File:	051018.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	103	50	150
4-Bromofluorobenzene	89	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW76-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	905079-15
Date Analyzed:	05/10/19	Data File:	051019.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	90	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 905079
Date Extracted:	05/09/19	Lab ID:	09-1066 mb
Date Analyzed:	05/09/19	Data File:	050910.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	95	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Hexane	<1
Methylene chloride	<5
Methyl t-butyl ether (MTBE)	<1
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
1,2-Dibromoethane (EDB)	<1
Benzene	<0.35
Trichloroethene	<0.5
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Date of Report: 05/23/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905079

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 905119-03 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	6.2	nm
Xylenes	ug/L (ppb)	4.8	<3	nm
Gasoline	ug/L (ppb)	140	150	7

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	103	65-118
Toluene	ug/L (ppb)	50	110	72-122
Ethylbenzene	ug/L (ppb)	50	110	73-126
Xylenes	ug/L (ppb)	150	105	74-118
Gasoline	ug/L (ppb)	1,000	99	69-134

Date of Report: 05/23/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905079

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	97	104	61-133	7

Date of Report: 05/23/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905079

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 905120-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	6.71	98	94	75-115	4

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	96	80-120

Date of Report: 05/23/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905079

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	1	72	67	67-116	7
2-Methylnaphthalene	ug/L (ppb)	1	80	73	63-122	9
1-Methylnaphthalene	ug/L (ppb)	1	79	73	65-122	8
Acenaphthylene	ug/L (ppb)	1	84	77	65-119	9
Acenaphthene	ug/L (ppb)	1	79	74	66-118	7
Fluorene	ug/L (ppb)	1	89	83	64-125	7
Phenanthrene	ug/L (ppb)	1	83	79	67-120	5
Anthracene	ug/L (ppb)	1	87	83	65-122	5
Fluoranthene	ug/L (ppb)	1	91	79	65-127	14
Pyrene	ug/L (ppb)	1	95	100	62-130	5
Benz(a)anthracene	ug/L (ppb)	1	92	90	60-118	2
Chrysene	ug/L (ppb)	1	90	86	66-125	5
Benzo(b)fluoranthene	ug/L (ppb)	1	86	84	55-135	2
Benzo(k)fluoranthene	ug/L (ppb)	1	87	80	62-125	8
Benzo(a)pyrene	ug/L (ppb)	1	92	86	58-127	7
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	94	86	36-142	9
Dibenz(a,h)anthracene	ug/L (ppb)	1	78	79	37-133	1
Benzo(g,h,i)perylene	ug/L (ppb)	1	78	79	34-135	1

Date of Report: 05/23/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905079

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	97	96	70-128	1
Chloroethane	ug/L (ppb)	50	89	90	66-149	1
1,1-Dichloroethene	ug/L (ppb)	50	84	85	75-119	1
Hexane	ug/L (ppb)	50	100	101	51-153	1
Methylene chloride	ug/L (ppb)	50	80	80	63-132	0
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	87	88	70-122	1
trans-1,2-Dichloroethene	ug/L (ppb)	50	88	87	76-118	1
1,1-Dichloroethane	ug/L (ppb)	50	86	86	77-119	0
cis-1,2-Dichloroethene	ug/L (ppb)	50	98	99	76-119	1
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	97	97	78-114	0
1,1,1-Trichloroethane	ug/L (ppb)	50	98	96	80-116	2
Benzene	ug/L (ppb)	50	93	93	75-116	0
Trichloroethene	ug/L (ppb)	50	94	95	72-119	1
Toluene	ug/L (ppb)	50	96	97	79-115	1
Tetrachloroethene	ug/L (ppb)	50	99	99	78-109	0
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	103	105	82-118	2
Ethylbenzene	ug/L (ppb)	50	96	97	83-111	1
m,p-Xylene	ug/L (ppb)	100	99	100	84-112	1
o-Xylene	ug/L (ppb)	50	91	91	81-117	0

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

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Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 905079
Work Order Number: 1905093

May 20, 2019

Attention Michael Erdahl:

Fremont Analytical, Inc. received 1 sample(s) on 5/6/2019 for the analyses presented in the following report.

Extractable Petroleum Hydrocarbons by NWEPH
Volatile Petroleum Hydrocarbons by NWVPH

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

Date: *05/20/2019*

CLIENT: Friedman & Bruya
Project: 905079
Work Order: 1905093

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1905093-001	MW03-050319	05/03/2019 9:52 AM	05/06/2019 12:48 PM

Case Narrative

WO#: **1905093**

Date: **5/20/2019**

CLIENT: Friedman & Bruya
Project: 905079

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **1905093**
Date Reported: **5/20/2019**

Client: Friedman & Bruya
Collection Date: 5/3/2019 9:52:00 AM
Project: 905079
Lab ID: 1905093-001
Matrix: Water
Client Sample ID: **MW03-050319**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 24488		Analyst: DW
Aliphatic Hydrocarbon (C10-C12)	ND	20.2	*	µg/L	1	5/16/2019 9:36:00 PM
Aliphatic Hydrocarbon (C12-C16)	ND	20.2		µg/L	1	5/16/2019 9:36:00 PM
Aliphatic Hydrocarbon (C16-C21)	ND	20.2		µg/L	1	5/16/2019 9:36:00 PM
Aliphatic Hydrocarbon (C21-C34)	ND	20.2		µg/L	1	5/16/2019 9:36:00 PM
Aliphatic Hydrocarbon (C8-C10)	ND	40.3	*	µg/L	1	5/16/2019 9:36:00 PM
Aromatic Hydrocarbon (C10-C12)	ND	20.2		µg/L	1	5/17/2019 3:29:00 AM
Aromatic Hydrocarbon (C12-C16)	22.9	20.2		µg/L	1	5/17/2019 3:29:00 AM
Aromatic Hydrocarbon (C16-C21)	ND	20.2		µg/L	1	5/17/2019 3:29:00 AM
Aromatic Hydrocarbon (C21-C34)	ND	20.2		µg/L	1	5/17/2019 3:29:00 AM
Aromatic Hydrocarbon (C8-C10)	ND	20.2	*	µg/L	1	5/17/2019 3:29:00 AM
Surr: 1-Chlorooctadecane	65.3	60 - 140		%Rec	1	5/16/2019 9:36:00 PM
Surr: o-Terphenyl	67.4	60 - 140		%Rec	1	5/17/2019 3:29:00 AM

NOTES:
* - Flagged value is not within established control limits.

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 24485		Analyst: CR
Aliphatic Hydrocarbon (C5-C6)	ND	40.0		µg/L	1	5/9/2019 10:18:24 AM
Aliphatic Hydrocarbon (C6-C8)	37.7	20.0		µg/L	1	5/9/2019 10:18:24 AM
Aliphatic Hydrocarbon (C8-C10)	62.0	20.0		µg/L	1	5/9/2019 10:18:24 AM
Aliphatic Hydrocarbon (C10-C12)	92.5	20.0		µg/L	1	5/9/2019 10:18:24 AM
Aromatic Hydrocarbon (C8-C10)	65.9	50.0		µg/L	1	5/9/2019 10:18:24 AM
Aromatic Hydrocarbon (C10-C12)	194	20.0		µg/L	1	5/9/2019 10:18:24 AM
Aromatic Hydrocarbon (C12-C13)	64.8	20.0		µg/L	1	5/9/2019 10:18:24 AM
Benzene	ND	20.0		µg/L	1	5/9/2019 10:18:24 AM
Toluene	ND	20.0		µg/L	1	5/9/2019 10:18:24 AM
Ethylbenzene	ND	20.0		µg/L	1	5/9/2019 10:18:24 AM
m,p-Xylene	ND	40.0		µg/L	1	5/9/2019 10:18:24 AM
o-Xylene	ND	20.0		µg/L	1	5/9/2019 10:18:24 AM
Naphthalene	ND	20.0		µg/L	1	5/9/2019 10:18:24 AM
Methyl tert-butyl ether (MTBE)	ND	20.0		µg/L	1	5/9/2019 10:18:24 AM
Surr: 1,4-Difluorobenzene	97.0	65 - 140		%Rec	1	5/9/2019 10:18:24 AM
Surr: Bromofluorobenzene	103	65 - 140		%Rec	1	5/9/2019 10:18:24 AM

Work Order: 1905093
CLIENT: Friedman & Bruya
Project: 905079

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **MB-24488** SampType: **MBLK** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **MBLKW** Batch ID: **24488** Analysis Date: **5/14/2019** SeqNo: **1013513**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	ND	20.1		0	0						
Aromatic Hydrocarbon (C12-C16)	ND	20.1		0	0						
Aromatic Hydrocarbon (C16-C21)	ND	20.1		0	0						
Aromatic Hydrocarbon (C21-C34)	ND	20.1		0	0						
Aromatic Hydrocarbon (C8-C10)	ND	20.1		0	0						*
Surr: o-Terphenyl	1,420		2,010		70.7	60	140				

NOTES:
* - Flagged value is not within established control limits.

Sample ID: **LCS-24488** SampType: **LCS** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW** Batch ID: **24488** Analysis Date: **5/14/2019** SeqNo: **1013510**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	1,770	19.9	2,489	0	70.9	70	130				
Aromatic Hydrocarbon (C12-C16)	1,960	19.9	2,489	0	78.7	70	130				
Aromatic Hydrocarbon (C16-C21)	2,160	19.9	2,489	0	86.7	70	130				
Aromatic Hydrocarbon (C21-C34)	2,320	19.9	2,489	0	93.1	70	130				
Aromatic Hydrocarbon (C8-C10)	1,460	19.9	2,489	0	58.8	70	130				S
Surr: o-Terphenyl	1,450		1,991		72.8	60	140				

NOTES:
S - Outlying spike recovery observed (low bias). Samples will be qualified with a *.

Sample ID: **LCSD-24488** SampType: **LCSD** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW02** Batch ID: **24488** Analysis Date: **5/14/2019** SeqNo: **1013511**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	1,820	20.0	2,504	0	72.6	70	130	1,766	2.95	20	
Aromatic Hydrocarbon (C12-C16)	2,130	20.0	2,504	0	84.9	70	130	1,959	8.25	20	
Aromatic Hydrocarbon (C16-C21)	2,210	20.0	2,504	0	88.1	70	130	2,157	2.29	20	
Aromatic Hydrocarbon (C21-C34)	2,270	20.0	2,504	0	90.7	70	130	2,317	2.00	20	
Aromatic Hydrocarbon (C8-C10)	1,480	20.0	2,504	0	59.1	70	130	1,464	1.05	20	S
Surr: o-Terphenyl	1,540		2,003		77.0	60	140		0		

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QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **LCSD-24488** SampType: **LCSD** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW02** Batch ID: **24488** Analysis Date: **5/14/2019** SeqNo: **1013511**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

NOTES:
S - Outlying spike recovery observed (low bias). Samples will be qualified with a *.

Sample ID: **MB-24488** SampType: **MBLK** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **MBLKW** Batch ID: **24488** Analysis Date: **5/15/2019** SeqNo: **1013559**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	ND	20.1		0	0						*
Aliphatic Hydrocarbon (C12-C16)	ND	20.1		0	0						
Aliphatic Hydrocarbon (C16-C21)	ND	20.1		0	0						
Aliphatic Hydrocarbon (C21-C34)	ND	20.1		0	0						
Aliphatic Hydrocarbon (C8-C10)	ND	40.2		0	0						*
Surr: 1-Chlorooctadecane	1,510		2,010		75.1	60	140				

NOTES:
* - Flagged value is not within established control limits.

Sample ID: **LCS-24488** SampType: **LCS** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW** Batch ID: **24488** Analysis Date: **5/15/2019** SeqNo: **1013557**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	1,520	19.9	2,489	0	60.9	70	130				S
Aliphatic Hydrocarbon (C12-C16)	1,880	19.9	2,489	0	75.7	70	130				
Aliphatic Hydrocarbon (C16-C21)	2,050	19.9	2,489	0	82.2	70	130				
Aliphatic Hydrocarbon (C21-C34)	4,050	19.9	4,979	0	81.3	70	130				
Aliphatic Hydrocarbon (C8-C10)	785	39.8	2,489	0	31.5	70	130				S
Surr: 1-Chlorooctadecane	1,590		1,991		80.0	60	140				

NOTES:
S - Outlying spike recovery observed (Aliphatic Hydrocarbon (C8-C10) and (C10-C12); low bias). Samples will be qualified with a *.

Work Order: 1905093
CLIENT: Friedman & Bruya
Project: 905079

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **LCSD-24488** SampType: **LCSD** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **LCSW02** Batch ID: **24488** Analysis Date: **5/15/2019** SeqNo: **1013558**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	1,540	20.0	5,008	0	30.8	70	130	1,516	1.73	20	S
Aliphatic Hydrocarbon (C12-C16)	1,550	20.0	5,008	0	30.9	70	130	1,885	19.7	20	S
Aliphatic Hydrocarbon (C16-C21)	1,980	20.0	5,008	0	39.6	70	130	2,047	3.15	20	S
Aliphatic Hydrocarbon (C21-C34)	3,450	20.0	5,008	0	68.9	70	130	4,048	15.9	20	S
Aliphatic Hydrocarbon (C8-C10)	735	40.1	10,020	0	7.34	70	130	784.9	6.52	20	S
Surr: 1-Chlorooctadecane	1,400		2,003		69.8	60	140		0		

NOTES:
S - Outlying spike recovery(ies) observed. A duplicate analysis was performed and recovered within range (Aliphatic Hydrocarbon (C12-C16), (C16-C21), and (C21-C34)).
S - Outlying spike recovery observed (Aliphatic Hydrocarbon (C8-C10) and (C10-C12); low bias). Samples will be qualified with a *.

Sample ID: **1905093-001ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **MW03-050319** Batch ID: **24488** Analysis Date: **5/16/2019** SeqNo: **1015489**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	ND	25.4		0	0			0		25	*
Aliphatic Hydrocarbon (C12-C16)	ND	25.4		0	0			0		25	
Aliphatic Hydrocarbon (C16-C21)	ND	25.4		0	0			0		25	
Aliphatic Hydrocarbon (C21-C34)	ND	25.4		0	0			0		25	
Aliphatic Hydrocarbon (C8-C10)	ND	50.8		0	0			0		25	*
Surr: 1-Chlorooctadecane	2,270		2,540		89.3	60	140		0		

NOTES:
* - Flagged value is not within established control limits.

Sample ID: **1905093-001ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **MW03-050319** Batch ID: **24488** Analysis Date: **5/17/2019** SeqNo: **1015495**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	ND	25.4		0	0			0		25	
Aromatic Hydrocarbon (C12-C16)	41.7	25.4		0	0			22.91	58.1	25	
Aromatic Hydrocarbon (C16-C21)	ND	25.4		0	0			0		25	
Aromatic Hydrocarbon (C21-C34)	ND	25.4		0	0			0		25	
Aromatic Hydrocarbon (C8-C10)	ND	25.4		0	0			0		25	*

Work Order: 1905093
CLIENT: Friedman & Bruya
Project: 905079

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **1905093-001ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51451**
Client ID: **MW03-050319** Batch ID: **24488** Analysis Date: **5/17/2019** SeqNo: **1015495**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: o-Terphenyl	1,830		2,540		71.9	60	140		0		

Work Order: 1905093
CLIENT: Friedman & Bruya
Project: 905079

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **LCS-24485** SampType: **LCS** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51316**
Client ID: **LCSW** Batch ID: **24485** Analysis Date: **5/9/2019** SeqNo: **1010081**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	582	40.0	600.0	0	97.1	70	130				
Aliphatic Hydrocarbon (C6-C8)	208	20.0	200.0	0	104	70	130				
Aliphatic Hydrocarbon (C8-C10)	192	20.0	200.0	0	96.1	70	130				
Aliphatic Hydrocarbon (C10-C12)	201	20.0	200.0	0	101	70	130				
Aromatic Hydrocarbon (C8-C10)	786	50.0	800.0	0	98.3	70	130				
Aromatic Hydrocarbon (C10-C12)	194	20.0	200.0	0	96.9	70	130				
Aromatic Hydrocarbon (C12-C13)	213	20.0	200.0	0	106	70	130				
Benzene	196	20.0	200.0	0	97.9	70	130				
Toluene	196	20.0	200.0	0	97.9	70	130				
Ethylbenzene	194	20.0	200.0	0	97.2	70	130				
m,p-Xylene	393	40.0	400.0	0	98.2	70	130				
o-Xylene	197	20.0	200.0	0	98.5	70	130				
Naphthalene	208	20.0	200.0	0	104	70	130				
Methyl tert-butyl ether (MTBE)	208	20.0	200.0	0	104	70	130				
Surr: 1,4-Difluorobenzene	51.8		50.00		104	65	140				
Surr: Bromofluorobenzene	53.0		50.00		106	65	140				

Sample ID: **LCSD-24485** SampType: **LCSD** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51316**
Client ID: **LCSW02** Batch ID: **24485** Analysis Date: **5/9/2019** SeqNo: **1010082**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	611	40.0	600.0	0	102	70	130	582.5	4.75	20	
Aliphatic Hydrocarbon (C6-C8)	198	20.0	200.0	0	99.1	70	130	207.6	4.69	20	
Aliphatic Hydrocarbon (C8-C10)	189	20.0	200.0	0	94.7	70	130	192.1	1.43	20	
Aliphatic Hydrocarbon (C10-C12)	207	20.0	200.0	0	104	70	130	201.1	3.10	20	
Aromatic Hydrocarbon (C8-C10)	813	50.0	800.0	0	102	70	130	786.3	3.28	20	
Aromatic Hydrocarbon (C10-C12)	197	20.0	200.0	0	98.6	70	130	193.8	1.74	20	
Aromatic Hydrocarbon (C12-C13)	196	20.0	200.0	0	98.0	70	130	212.7	8.14	20	
Benzene	202	20.0	200.0	0	101	70	130	195.9	3.01	20	
Toluene	202	20.0	200.0	0	101	70	130	195.8	3.14	20	

Work Order: 1905093
CLIENT: Friedman & Bruya
Project: 905079

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **LCSD-24485** SampType: **LCSD** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51316**
Client ID: **LCSW02** Batch ID: **24485** Analysis Date: **5/9/2019** SeqNo: **1010082**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethylbenzene	202	20.0	200.0	0	101	70	130	194.4	3.78	20	
m,p-Xylene	408	40.0	400.0	0	102	70	130	392.9	3.79	20	
o-Xylene	203	20.0	200.0	0	102	70	130	197.0	3.13	20	
Naphthalene	213	20.0	200.0	0	106	70	130	208.3	2.10	20	
Methyl tert-butyl ether (MTBE)	207	20.0	200.0	0	104	70	130	207.5	0.181	20	
Surr: 1,4-Difluorobenzene	51.0		50.00		102	65	140		0		
Surr: Bromofluorobenzene	51.8		50.00		104	65	140		0		

Sample ID: **MB-24485** SampType: **MBLK** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51316**
Client ID: **MBLKW** Batch ID: **24485** Analysis Date: **5/9/2019** SeqNo: **1010083**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	ND	40.0		0	0						
Aliphatic Hydrocarbon (C6-C8)	ND	20.0		0	0						
Aliphatic Hydrocarbon (C8-C10)	ND	20.0		0	0						
Aliphatic Hydrocarbon (C10-C12)	ND	20.0		0	0						
Aromatic Hydrocarbon (C8-C10)	ND	50.0		0	0						
Aromatic Hydrocarbon (C10-C12)	ND	20.0		0	0						
Aromatic Hydrocarbon (C12-C13)	ND	20.0		0	0						
Benzene	ND	20.0		0	0						
Toluene	ND	20.0		0	0						
Ethylbenzene	ND	20.0		0	0						
m,p-Xylene	ND	40.0		0	0						
o-Xylene	ND	20.0		0	0						
Naphthalene	ND	20.0		0	0						
Methyl tert-butyl ether (MTBE)	ND	20.0		0	0						
Surr: 1,4-Difluorobenzene	48.5		50.00		97.0	65	140				
Surr: Bromofluorobenzene	50.9		50.00		102	65	140				

Work Order: 1905093
CLIENT: Friedman & Bruya
Project: 905079

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **1905058-001BDUP** SampType: **DUP** Units: **µg/L** Prep Date: **5/8/2019** RunNo: **51316**
Client ID: **BATCH** Batch ID: **24485** Analysis Date: **5/9/2019** SeqNo: **1010077**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	93.4	40.0		0	0			89.20	4.64	25	
Aliphatic Hydrocarbon (C6-C8)	ND	20.0		0	0			0		25	
Aliphatic Hydrocarbon (C8-C10)	ND	20.0		0	0			0		25	
Aliphatic Hydrocarbon (C10-C12)	ND	20.0		0	0			0		25	
Aromatic Hydrocarbon (C8-C10)	ND	50.0		0	0			0		25	
Aromatic Hydrocarbon (C10-C12)	ND	20.0		0	0			0		25	
Aromatic Hydrocarbon (C12-C13)	ND	20.0		0	0			0		25	
Benzene	ND	20.0		0	0			0		25	
Toluene	ND	20.0		0	0			0		25	
Ethylbenzene	ND	20.0		0	0			0		25	
m,p-Xylene	ND	40.0		0	0			0		25	
o-Xylene	ND	20.0		0	0			0		25	
Naphthalene	ND	20.0		0	0			0		25	
Methyl tert-butyl ether (MTBE)	ND	20.0		0	0			0		25	
Surr: 1,4-Difluorobenzene	50.1		50.00		100	65	140		0		
Surr: Bromofluorobenzene	52.1		50.00		104	65	140		0		

Sample Log-In Check List

Client Name:	**FB**	Work Order Number:	**1905093**
Logged by:	**Mike Ridgeway**	Date Received:	**5/6/2019 12:48:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes ☑	No ☐	NA ☐
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☑	No ☐	NA ☐ HCL
12.	Is there headspace in the VOA vials?	Yes ☐	No ☑	NA ☐
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Cooler	3.1
Sample	5.4

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

1905093

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 Fax # (206) 283-5044

SUBCONTRACTER Fremont

PROJECT NAME/NO.	PO #
905079.	B-253

REMARKS

Please Email Results

TURNAROUND TIME

☒ Standard (2 Weeks)

☐ RUSH

Rush charges authorized by:

SAMPLE DISPOSAL

☐ Dispose after 30 days

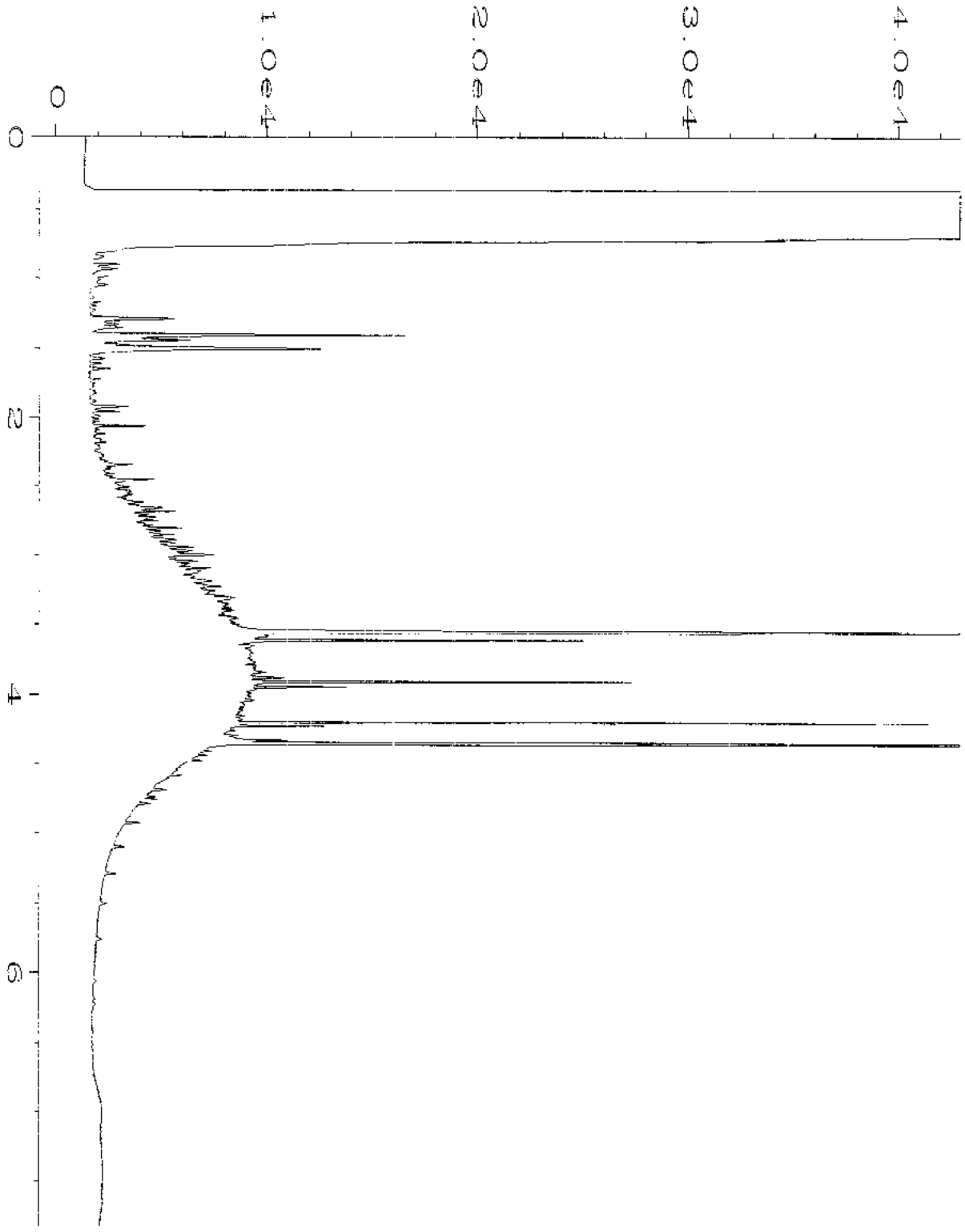
☐ Return samples

☐ Will call with instructions

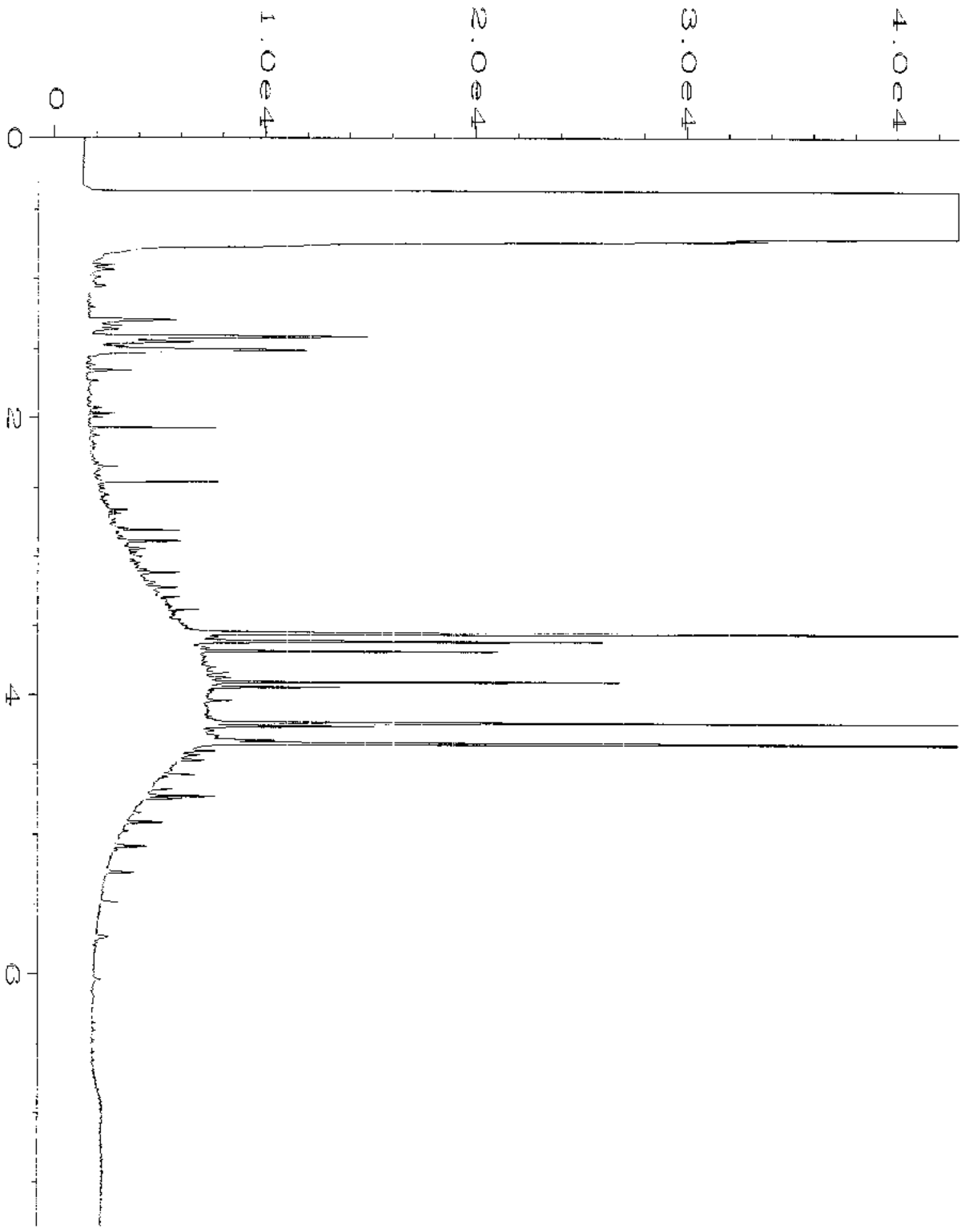
Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: Dioxins/Furans	EPH	VPH								Notes
MW03-050319		5/3/19	0952	H_2O			X	X								

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	5/6/19	11:00 AM
Received by:		Phoebe Autio	FAI	5/6/19	12:48 PM
Relinquished by:					
Received by:					

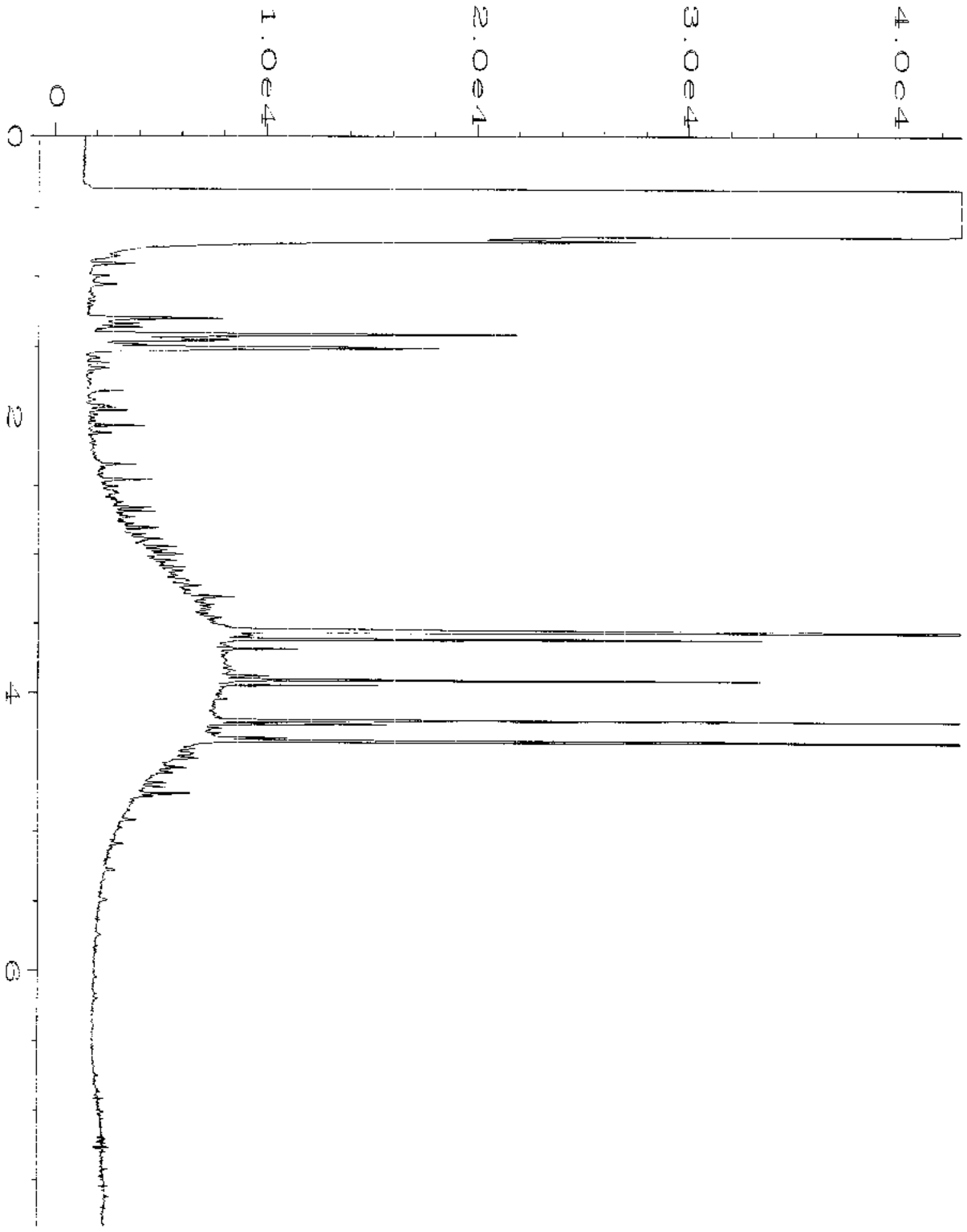


Data File Name	: C:\HPCHEM\4\DATA\05-09-19\037F1901.D		
Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 37
Sample Name	: 905079-02	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 19
Acquired on	: 10 May 19 05:59 AM	Instrument Method	: DX.MTH
Report Created on	: 10 May 19 10:12 AM	Analysis Method	: DX.MTH

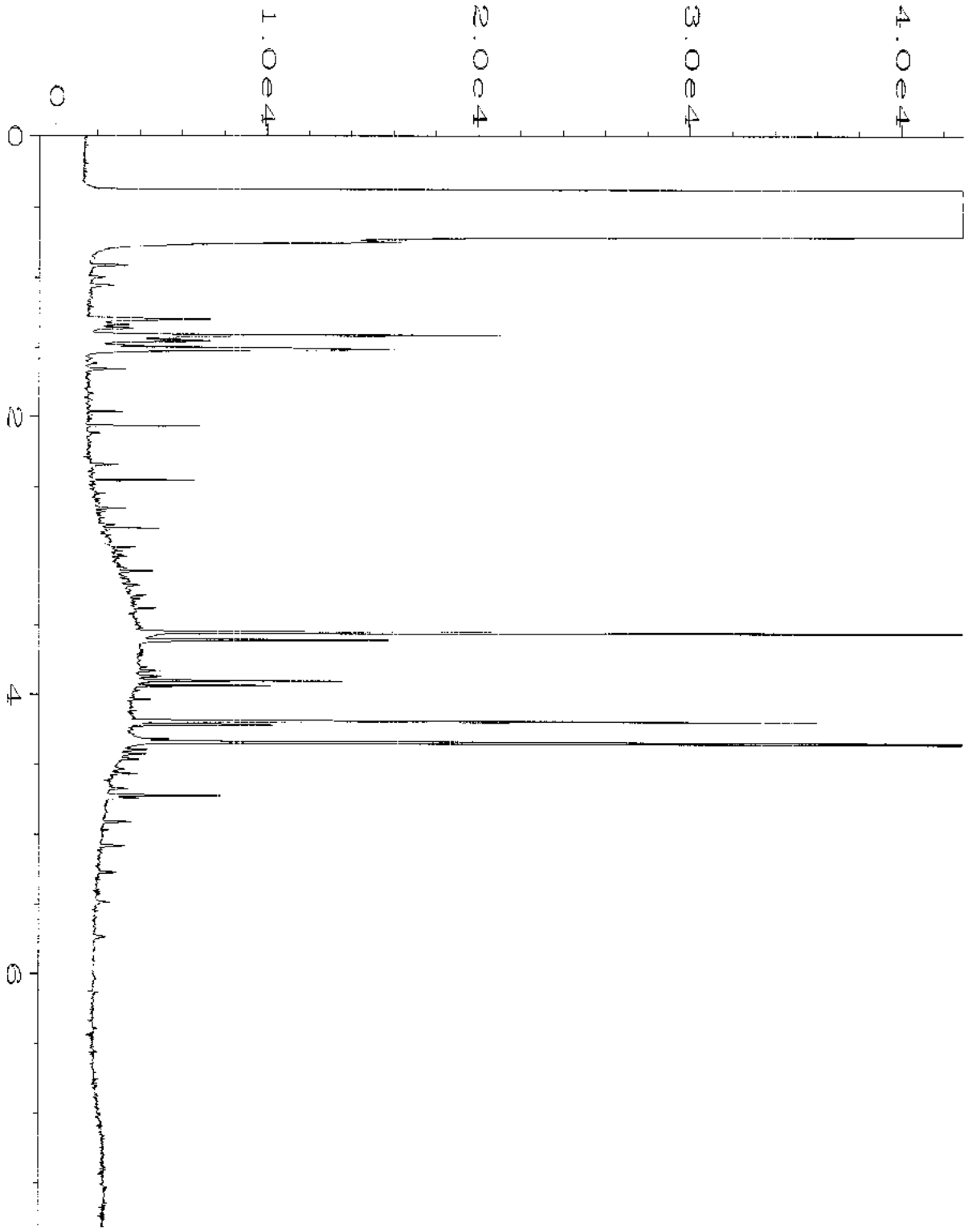


Data File Name : C:\HPCHEM\4\DATA\05-09-19\038F1901.D
Operator : TL
Instrument : GC#4
Sample Name : 905079-11
Run Time Bar Code:
Acquired on : 10 May 19 06:11 AM
Report Created on: 10 May 19 10:13 AM

Page Number : 1
Vial Number : 38
Injection Number : 1
Sequence Line : 19
Instrument Method: DX.MTH
Analysis Method : DX.MTH

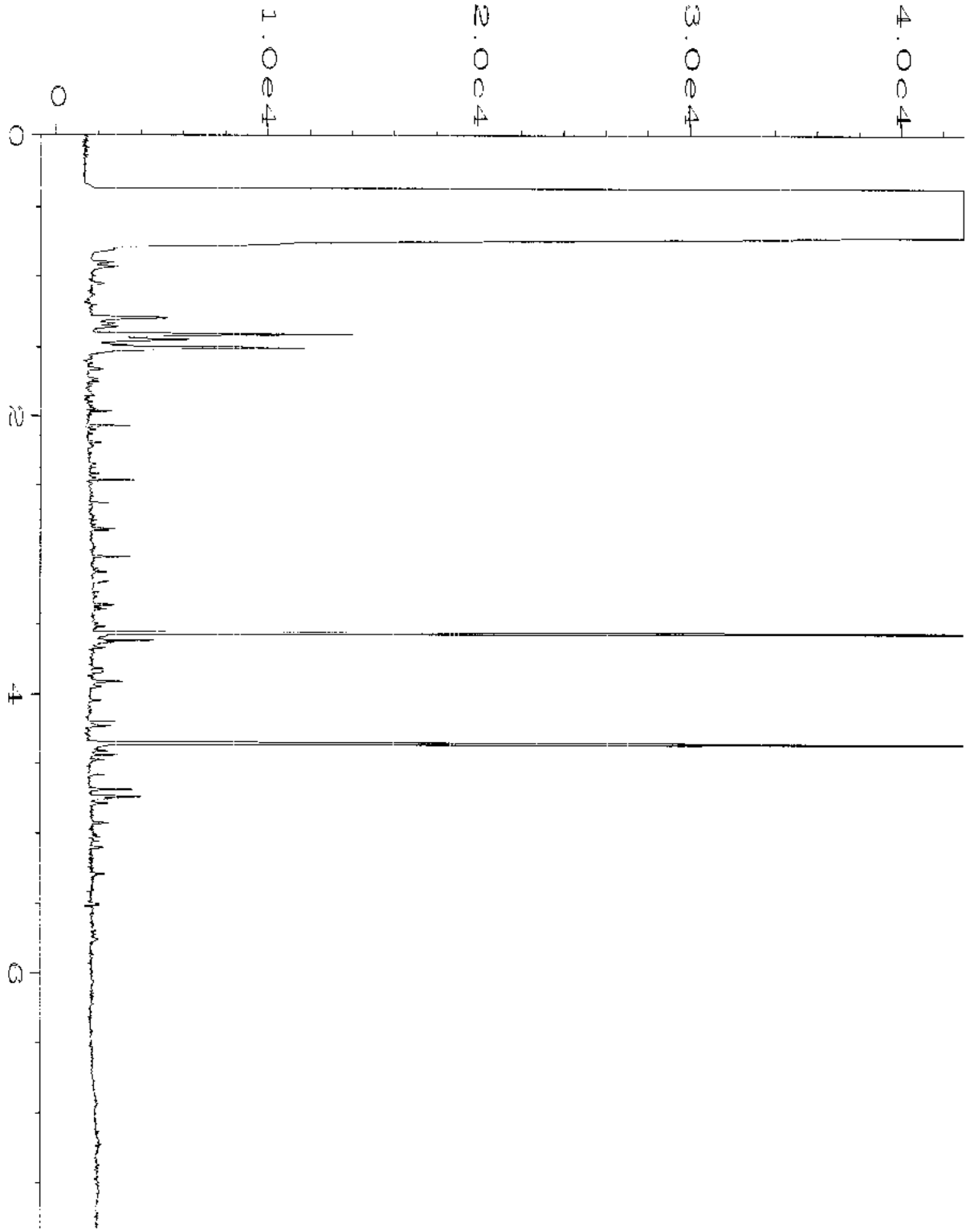


Data File Name	: C:\HPCHEM\4\DATA\05-09-19\039F1901.D		
Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 39
Sample Name	: 905079-12	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 19
Acquired on	: 10 May 19 06:23 AM	Instrument Method	: DX.MTH
Report Created on	: 10 May 19 10:13 AM	Analysis Method	: DX.MTH



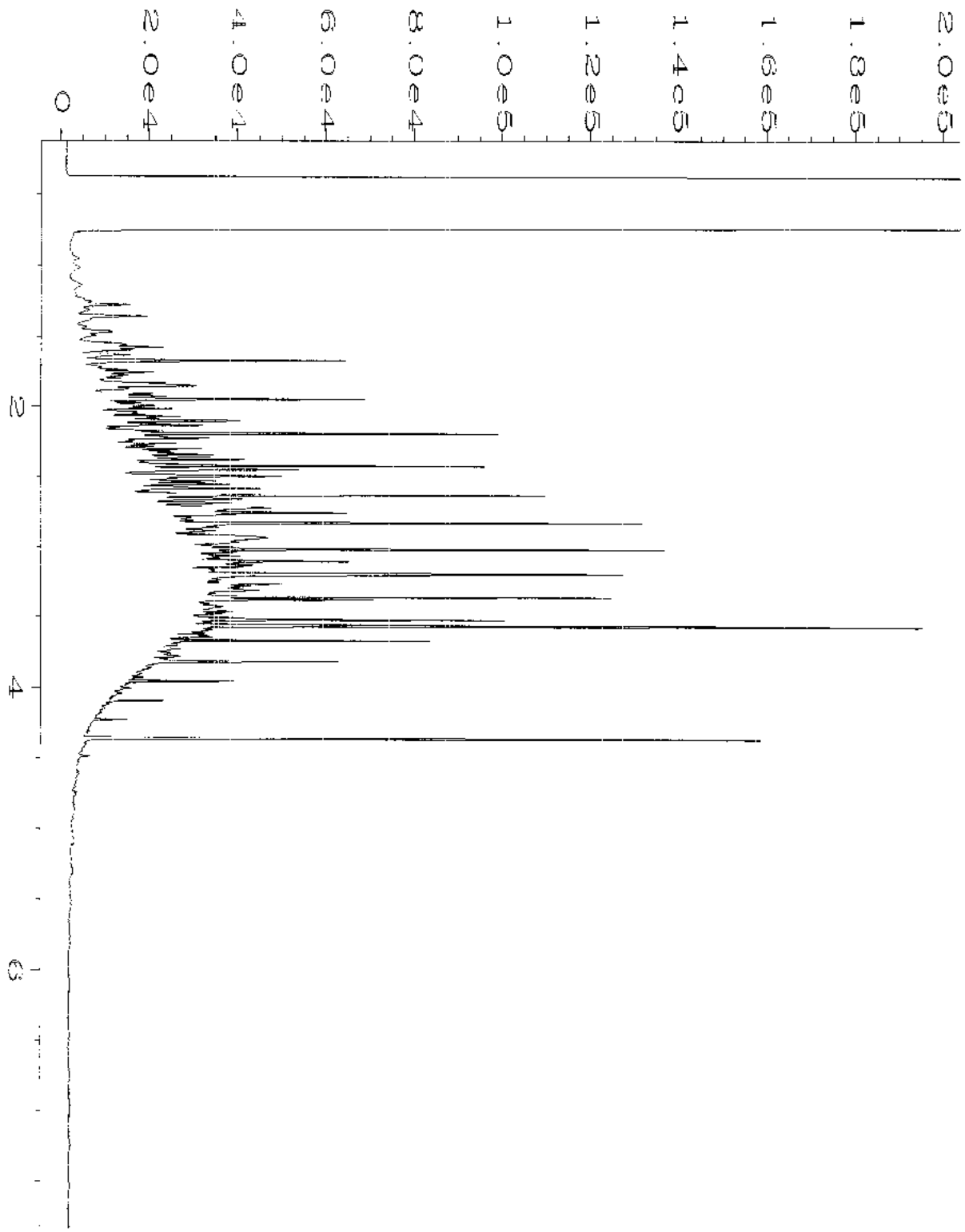
Data File Name : C:\HPCHEM\4\DATA\05-09-19\040F1901.D
Operator : TL
Instrument : GC#4
Sample Name : 905079-15
Run Time Bar Code:
Acquired on : 10 May 19 06:35 AM
Report Created on: 10 May 19 10:13 AM

Page Number : 1
Vial Number : 40
Injection Number : 1
Sequence Line : 19
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\4\DATA\05-09-19\033F1901.D
Operator : TL
Instrument : GC#4
Sample Name : 09-1079 mb
Run Time Bar Code:
Acquired on : 10 May 19 05:11 AM
Report Created on: 10 May 19 10:11 AM

Page Number : 1
Vial Number : 33
Injection Number : 1
Sequence Line : 19
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\4\DATA\05-09-19\093F1801.D
Operator : TL
Instrument : GC#4
Sample Name : 500 Dx 56-131E
Run Time Bar Code:
Acquired on : 10 May 19 04:59 AM
Report Created on: 10 May 19 10:12 AM

Page Number : 1
Vial Number : 93
Injection Number : 1
Sequence Line : 18
Instrument Method: DX.MTH
Analysis Method : DX.MTH

905079

SAMPLE CHAIN OF CUSTODY

MG 05-03-19

Page # 1 of 2 DO4/

Report To Lynn Grochala
Company Floyd Snider
Address 601 Union St, Ste 600
City, State, ZIP Seattle, WA 98101
Phone 206-292-2078 Email lynn.grochala@floydsnider.com

SAMPLERS (*signature*)

PROJECT NAME: Cantera - TOC

PO #

REMARKS: 48HO

INVOICE TO

TURNAROUND TIME
- [x] Standard Turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Archive Samples
- [ ] Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	cVOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM					Notes
						ANALYSES REQUESTED											
01MW77-050319	01 A-C	5/3/19	1110	W	3					X							
01MW85-050319	02 A-D		1155		4		X			X							
01MW106 050319	03 A-C		1127		3					X							
01MW108-050319	04		1455		3					X							
trip blanks	05		—		3			X	X								

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Layni Wachter	Layni Wachter	Floyd|Snider	5/3/19	17:37
Received by:		Nhan Phan	FEBT	5/3/19	1737
Relinquished by:					
Received by:			Samples received at 4 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

905079

SAMPLE CHAIN OF CUSTODY

ME 05-03-19

Page # 2 of 2

Report To Lynn Grachala

Company Floyd | Snider

Address (see p-1)

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME: Cantera -TOC

PO #

REMARKS: ASAP

INVOICE TO

TURNAROUND TIME
- ~~Standard Turnaround~~
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ~~Dispose after 30 days~~
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	VOCs (VPH Targets) BTEX by 8021B	cVOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM (EPH Target)	VPH + Targets	EPH + Targets	As (total)	Lipids + BTEX (SM 21)	Notes
MW01-050319	06 A-C	5/3/19	1142	W	3					X							(X)-per COC
MW02-050319	07		1151		3					X							ME 5/3/19.
MW102-050319	08		1155		3					X							
MW03-050319	09 A-I		0952		9				(X)	X		(X)	X	X	X		lab preserve As
MW04-050319	10 A-C		1015		3											X	
MW05-050319	11 A-G		1008		7		X	X								X	
MW06-050319	12 A-D		1000		4		X		SM	EA						X	
~~MW07~~ 01MW64-050319	13 A-C		1215		3					X							
01MW65-050319	14		1015		3					X							
01MW76-050319	15 A-D		1330		4		X			X							

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Layni Wachter	Layni Wachter	Floyd|Snider	5/3/19	15:37
Received by:	Nhan Phan	FEBI	5/3/19	1732
Relinquished by:				
Received by:		Samples received at 4 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 20, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included is the amended report from the testing of material submitted on May 3, 2019 from the Cantera-TOC, F&BI 905080 project. The 8021B benzene reporting limits were lowered to meet the QAPP requirements.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0517R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

May 17, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on May 3, 2019 from the Cantera-TOC, F&BI 905080 project. There are 12 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0517R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on May 3, 2019 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera-TOC, F&BI 905080 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
905080 -01	01MW88-050319
905080 -02	01MW104-050319
905080 -03	Trip Blanks

The 8021B benzene reporting limit was reported below the lowest calibration point. The data were qualified accordingly.

All quality control requirements were acceptable.

Date of Report: 05/17/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905080
Date Extracted: 05/06/19
Date Analyzed: 05/06/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
01MW104-050319 905080-02	<0.35 j	<1	<1	<3	<100	114
Trip Blanks 905080-03	<0.35 j	<1	<1	<3	<100	114
Method Blank 09-830 MB	<0.35 j	<1	<1	<3	<100	85

Date of Report: 05/17/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905080
Date Extracted: 05/08/19
Date Analyzed: 05/08/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
01MW88-050319 905080-01	56 x	<250	96
01MW104-050319 905080-02	120	<250	89
Method Blank 09-1062 MB	<50	<250	105

Analysis for Semivolatile Phenols By EPA Method 8270D SIM

Client Sample ID:	01MW104-050319 cf	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905080
Date Extracted:	05/07/19	Lab ID:	905080-02
Date Analyzed:	05/09/19	Data File:	050914.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	20	17	97
Phenol-d6	16	10	62
2,4,6-Tribromophenol	104	33	166

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<0.2

Analysis for Semivolatile Phenols By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 905080
Date Extracted:	05/07/19	Lab ID:	09-1048 mb
Date Analyzed:	05/09/19	Data File:	050907.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	18	17	97
Phenol-d6	28	10	62
2,4,6-Tribromophenol	90	33	166

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<0.2

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	01MW88-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905080
Date Extracted:	05/07/19	Lab ID:	905080-01 1/2
Date Analyzed:	05/08/19	Data File:	050809.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	108	31	160
Benzo(a)anthracene-d12	119	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.4
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.04
1-Methylnaphthalene	<0.4
2-Methylnaphthalene	<0.4

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 905080
Date Extracted:	05/07/19	Lab ID:	09-1049 mb
Date Analyzed:	05/08/19	Data File:	050806.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	106	31	160
Benzo(a)anthracene-d12	116	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.2
Acenaphthylene	<0.02
Acenaphthene	<0.02
Fluorene	<0.02
Phenanthrene	<0.02
Anthracene	<0.02
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.02
1-Methylnaphthalene	<0.2
2-Methylnaphthalene	<0.2

Date of Report: 05/17/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905080

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 905024-02 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	490	510	4
Toluene	ug/L (ppb)	6.2	5.9	5
Ethylbenzene	ug/L (ppb)	1.3	1.2	5
Xylenes	ug/L (ppb)	6.3	5.8	8
Gasoline	ug/L (ppb)	2,000	2,100	5

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	91	65-118
Toluene	ug/L (ppb)	50	89	72-122
Ethylbenzene	ug/L (ppb)	50	86	73-126
Xylenes	ug/L (ppb)	150	89	74-118
Gasoline	ug/L (ppb)	1,000	108	69-134

Date of Report: 05/17/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905080

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	109	111	63-142	2

Date of Report: 05/17/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905080

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR SEMIVOLATILE PHENOLS BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 30)
Pentachlorophenol	ug/L (ppb)	2.5	71	88	23-185	21

Date of Report: 05/17/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905080

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	1	68	69	67-116	1
2-Methylnaphthalene	ug/L (ppb)	1	73	75	63-122	3
1-Methylnaphthalene	ug/L (ppb)	1	73	75	65-122	3
Acenaphthylene	ug/L (ppb)	1	79	79	65-119	0
Acenaphthene	ug/L (ppb)	1	77	76	66-118	1
Fluorene	ug/L (ppb)	1	84	83	64-125	1
Phenanthrene	ug/L (ppb)	1	84	82	67-120	2
Anthracene	ug/L (ppb)	1	86	84	65-122	2
Fluoranthene	ug/L (ppb)	1	90	89	65-127	1
Pyrene	ug/L (ppb)	1	90	97	62-130	7
Benz(a)anthracene	ug/L (ppb)	1	94	92	60-118	2
Chrysene	ug/L (ppb)	1	92	90	66-125	2
Benzo(b)fluoranthene	ug/L (ppb)	1	87	86	55-135	1
Benzo(k)fluoranthene	ug/L (ppb)	1	86	87	62-125	1
Benzo(a)pyrene	ug/L (ppb)	1	90	89	58-127	1
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	94	89	36-142	5
Dibenz(a,h)anthracene	ug/L (ppb)	1	89	85	37-133	5
Benzo(g,h,i)perylene	ug/L (ppb)	1	87	83	34-135	5

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

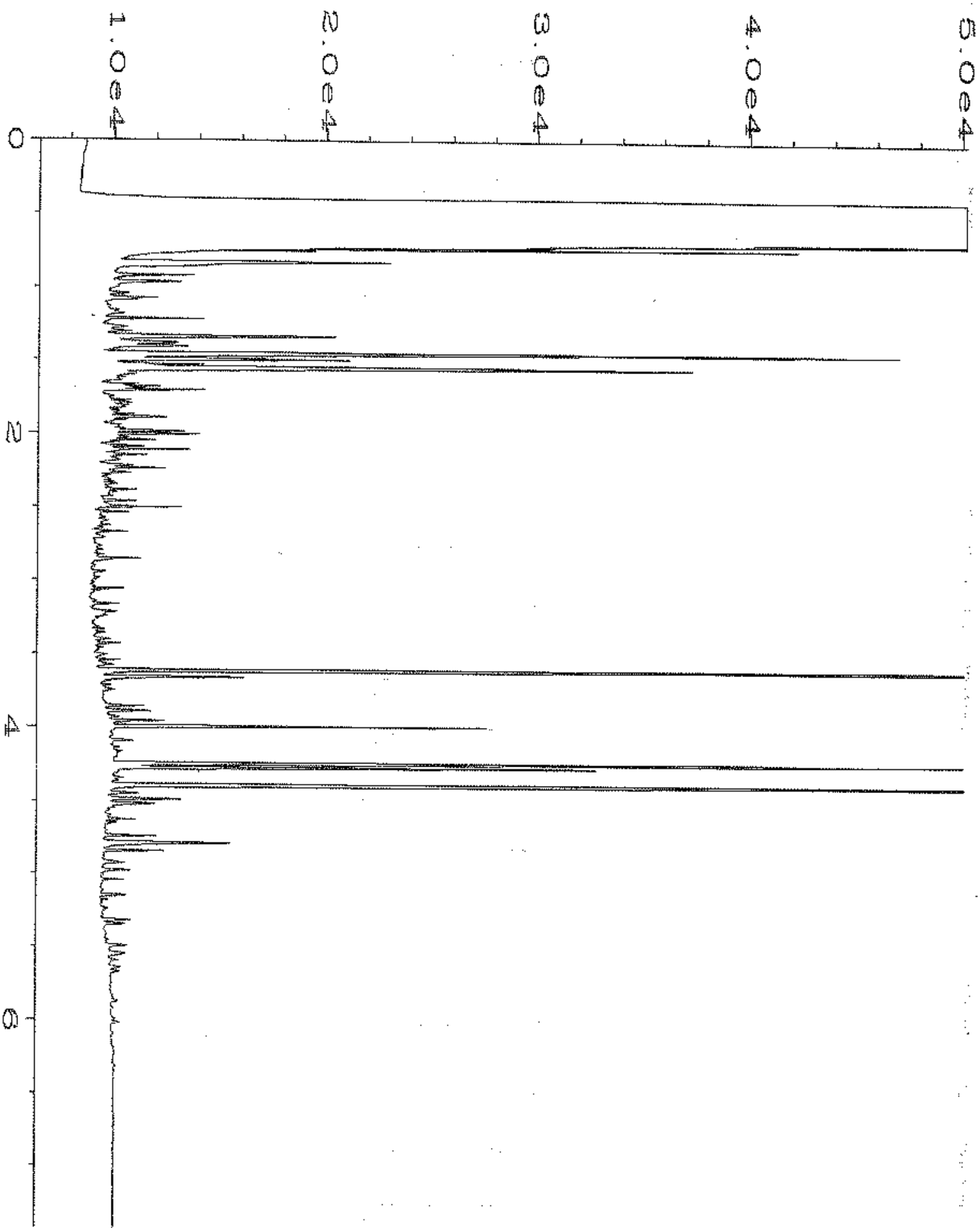
nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

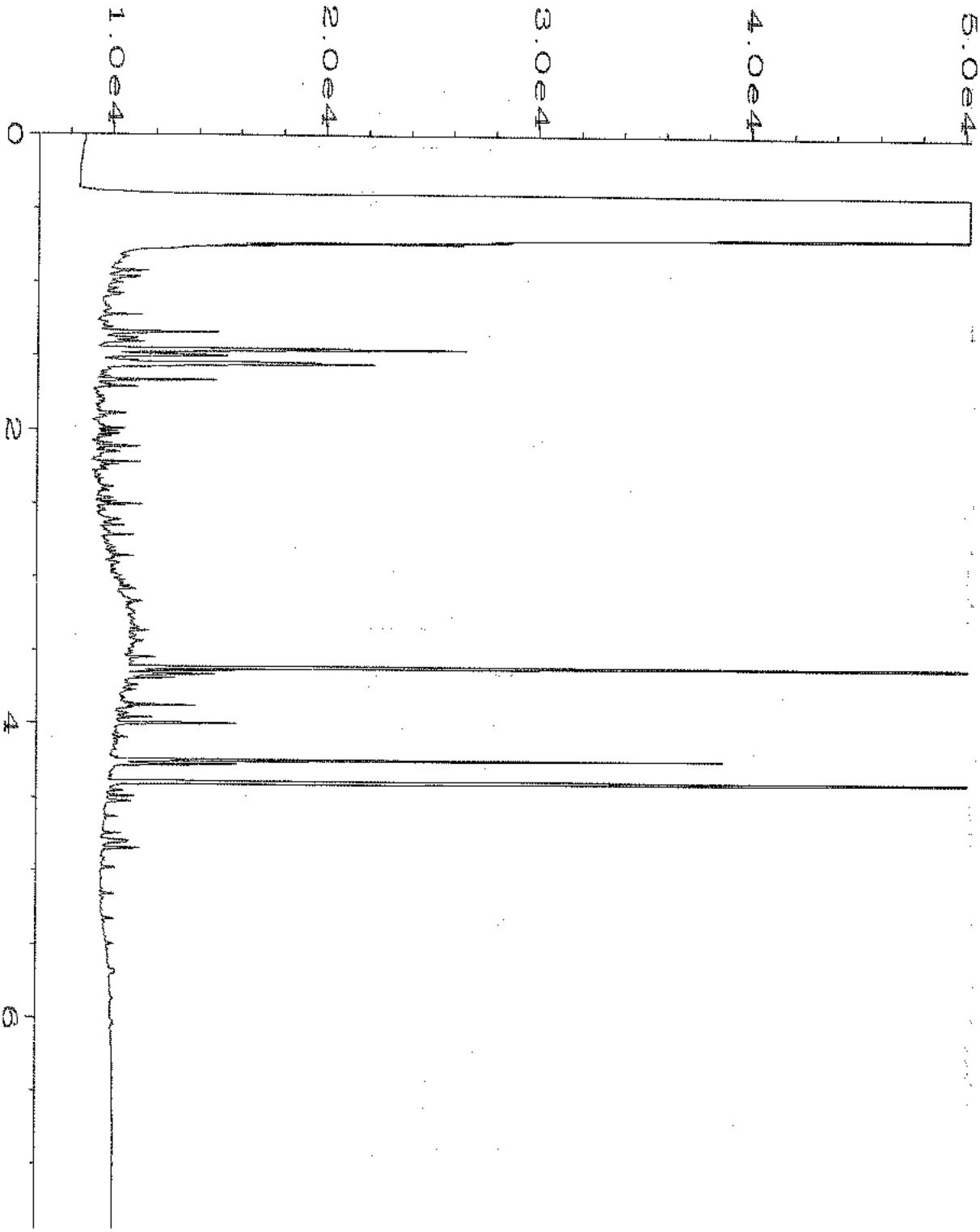
vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.



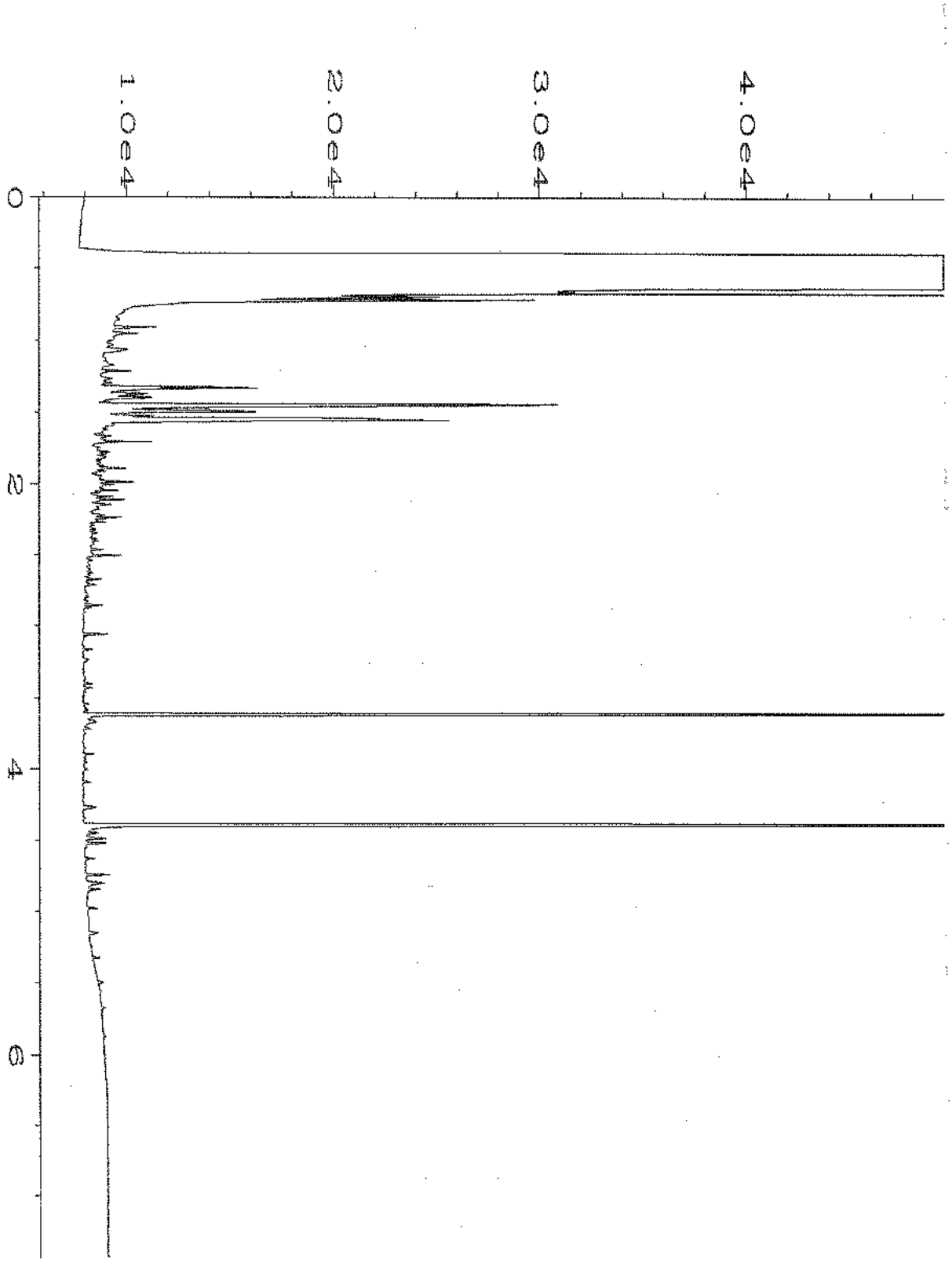
Data File Name : C:\HPCHEM\1\DATA\05-08-19\055F1801.D
Operator : TL
Instrument : GC1
Sample Name : 905080-01
Run Time Bar Code:
Acquired on : 09 May 19 00:54 AM
Report Created on: 09 May 19 11:29 AM

Page Number : 1
Vial Number : 55
Injection Number : 1
Sequence Line : 18
Instrument Method: DX.MTH
Analysis Method : DX.MTH



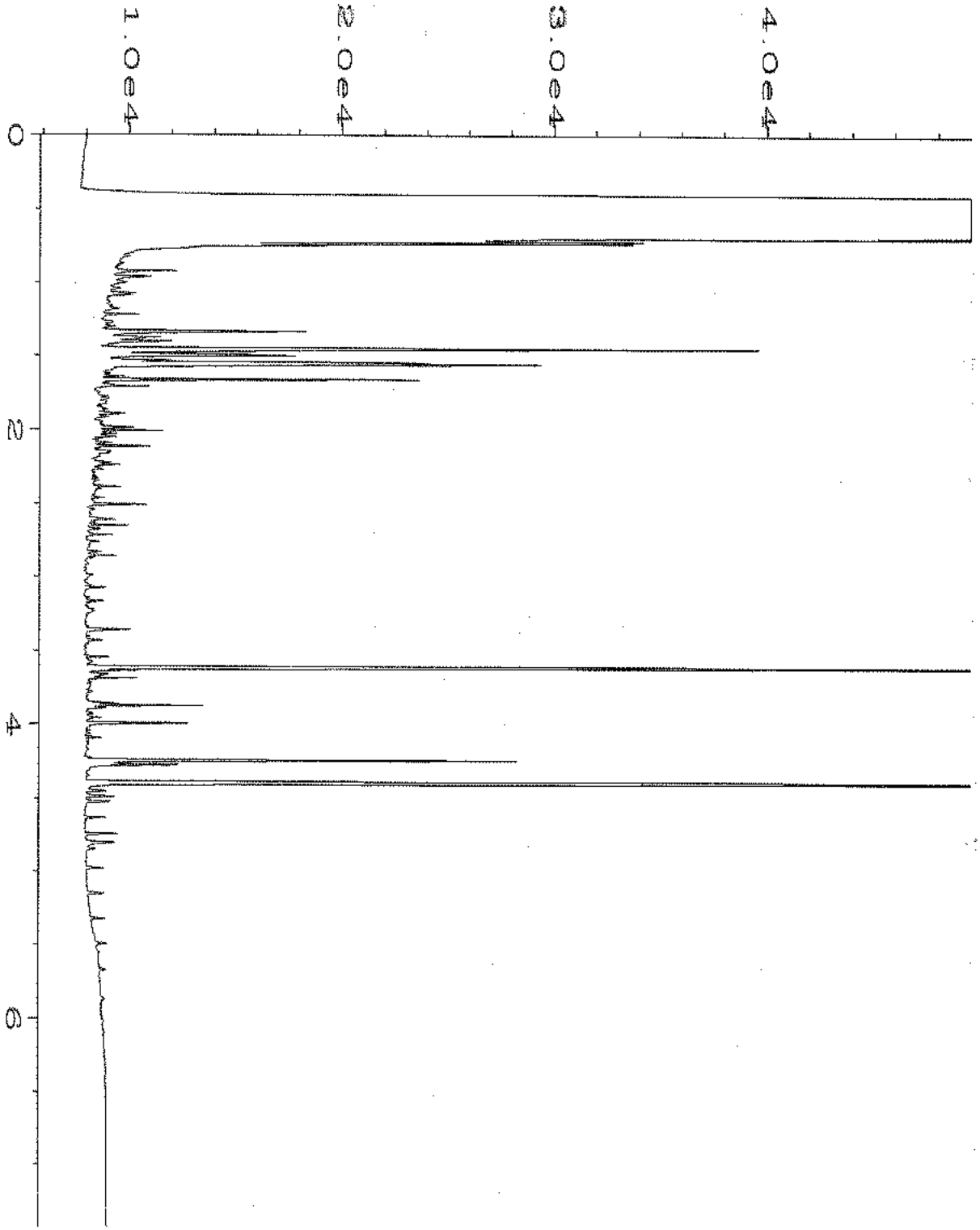
Data File Name : C:\HPCHEM\1\DATA\05-08-19\056F1801.D
Operator : TL
Instrument : GC1
Sample Name : 905080-02
Run Time Bar Code:
Acquired on : 09 May 19 01:05 AM
Report Created on: 09 May 19 11:29 AM

Page Number : 1
Vial Number : 56
Injection Number : 1
Sequence Line : 18
Instrument Method: DX.MTH
Analysis Method : DX.MTH

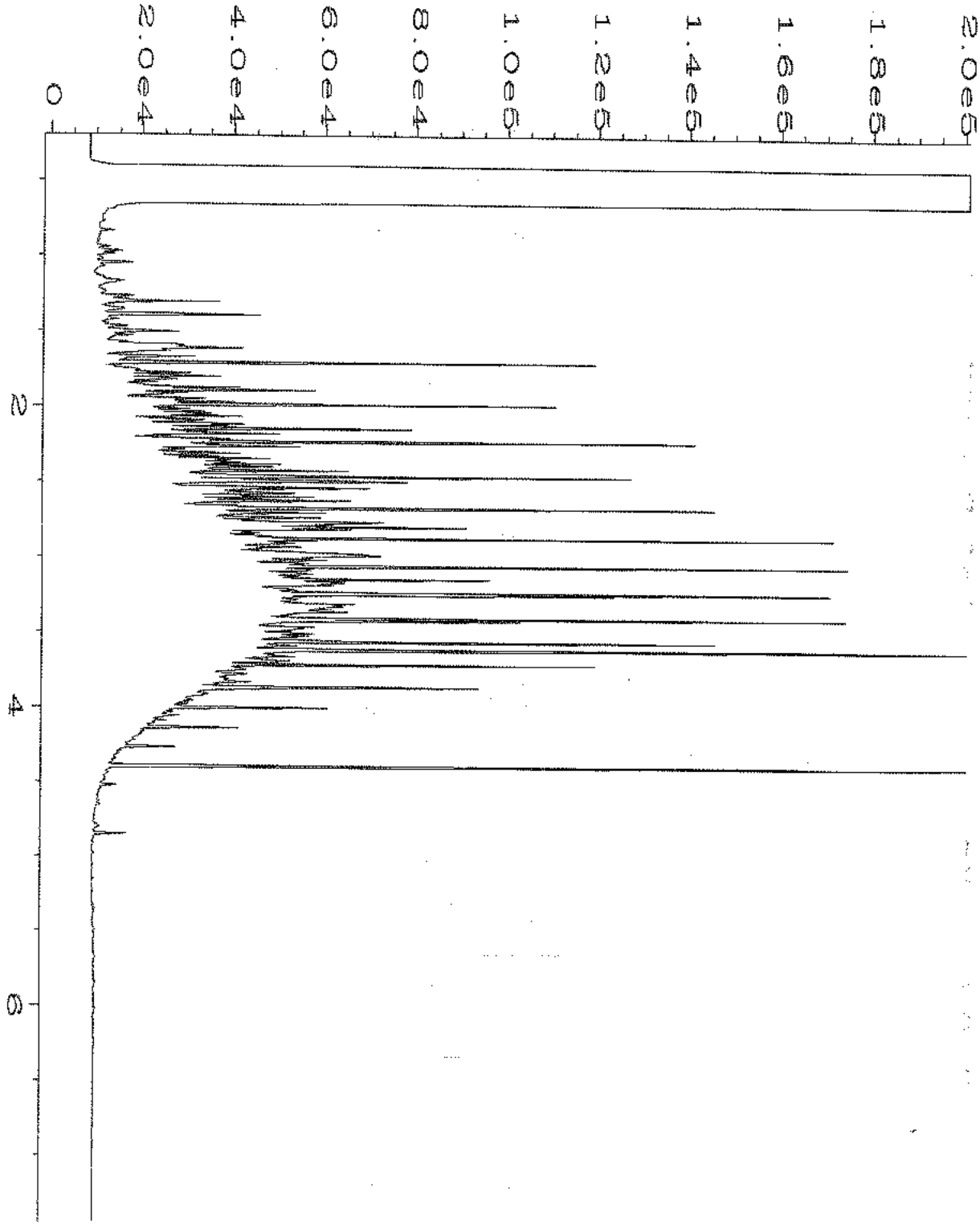


Data File Name : C:\HPCHEM\1\DATA\05-08-19\033F1601.D
Operator : TL
Instrument : GC1
Sample Name : 09-1062 mb
Run Time Bar Code:
Acquired on : 08 May 19 08:22 PM
Report Created on: 09 May 19 11:30 AM

Page Number : 1
Vial Number : 33
Injection Number : 1
Sequence Line : 16
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name	: C:\HPCHEM\1\DATA\05-08-19\036F1601.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 36
Sample Name	: 09-1062 mb2	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 16
Acquired on	: 08 May 19 08:56 PM	Instrument Method	: DX.MTH
Report Created on	: 09 May 19 11:32 AM	Analysis Method	: DX.MTH



Data File Name : C:\HPCHEM\1\DATA\05-08-19\003F1701.D
Operator : TL
Instrument : GC1
Sample Name : 500 Dx 56-131E
Run Time Bar Code:
Acquired on : 09 May 19 00:42 AM
Report Created on: 09 May 19 11:30 AM

Page Number : 1
Vial Number : 3
Injection Number : 1
Sequence Line : 17
Instrument Method: DX.MTH
Analysis Method : DX.MTH

~~905077~~ 905080 (rp)

SAMPLE CHAIN OF CUSTODY

ME 05-03-19

Page # 1 of 1 PO 41

Report To Lynn Grochala
Company Floyd | Snider
Address 601 Union St, Ste 600
City, State, ZIP Seattle, WA 98101
Phone 206-292-2078 email lynn.grochala @floydsnider.com

SAMPLERS (*signature*)

PROJECT NAME: Cantera - TOC
PO #:
REMARKS: Bulk Terminal
INVOICE TO:

TURNAROUND TIME (VW 1)
- ~~X~~ Standard Turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ~~X~~ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	Penta				Notes
01 MW88-050319	01 A-B	5/3/19	1600	W	2		X					X					low volume for DX
01 MW104-050319	02 A-F	↓	1615	↓	6		X	X	X				X				lab centrifuge
trip blanks	03 A-C	↓	—	↓	3			X	X								

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Layni Wachter	Floyd|Snider	5/3/19	17:37
Received by:	[illegible]	FEBT	5/3/19	1737
Relinquished by:				
Received by:		Samples received at 4 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

September 13, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included is the amended report from the testing of material submitted on May 3, 2019 from the Cantera-TOC, F&BI 905081 project. The benzene and cadmium reporting limits were lowered.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0522R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
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Eric Young, B.S.

3012 16th Avenue West
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www.friedmanandbruya.com

May 22, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on May 3, 2019 from the Cantera-TOC, F&BI 905081 project. There are 22 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0522R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on May 3, 2019 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera-TOC, F&BI 905081 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
905081 -01	02MW03-050319
905081 -02	02MW04-050319
905081 -03	02MW05-050319
905081 -04	02MW06-050319
905081 -05	02MW07-050319
905081 -06	02MW08-050319
905081 -07	02MW016-050319
905081 -08	Trip Blanks

All quality control requirements were acceptable.

Date of Report: 05/22/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905081
Date Extracted: 05/07/19
Date Analyzed: 05/09/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
02MW03-050319 905081-01	<0.35 j	<1	<1	<3	<100	84
02MW05-050319 905081-03	<0.35 j	<1	<1	<3	<100	83
Trip Blanks 905081-08	<0.35 j	<1	<1	<3	<100	81
Method Blank 09-832 MB	<0.35 j	<1	<1	<3	<100	89

Date of Report: 05/22/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905081
Date Extracted: 05/09/19
Date Analyzed: 05/09/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 47-140)
02MW03-050319 905081-01	240 x	<250	113
02MW05-050319 905081-03	86 x	<250	116
02MW06-050319 905081-04	110 x	<250	116
02MW07-050319 905081-05	220 x	450 x	109
02MW08-050319 905081-06 1/1.2	110 x	<300	118
02MW016-050319 905081-07	200 x	<250	107
Method Blank 09-1079 MB	<50	<250	86

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW07-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905081
Date Extracted:	05/07/19	Lab ID:	905081-05
Date Analyzed:	05/07/19	Data File:	905081-05.076
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	4.24
Barium	22.4
Chromium	2.06
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	NA	Project:	Cantera-TOC, F&BI 905081
Date Extracted:	05/07/19	Lab ID:	I9-298 mb
Date Analyzed:	05/07/19	Data File:	I9-298 mb.061
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	<1
Chromium	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW07-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905081
Date Extracted:	05/07/19	Lab ID:	905081-05
Date Analyzed:	05/16/19	Data File:	905081-05.067
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Cadmium	<0.2
Lead	5.98
Silver	<0.25

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	NA	Project:	Cantera-TOC, F&BI 905081
Date Extracted:	05/07/19	Lab ID:	I9-298 mb
Date Analyzed:	05/16/19	Data File:	I9-298 mb.033
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Cadmium	<0.2
Lead	<0.5
Silver	<0.25

Date of Report: 05/22/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905081
Date Extracted: 05/15/19
Date Analyzed: 05/16/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Total Mercury
02MW07-050319 905081-05	<0.1
Method Blank i9-316 MB	<0.1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	02MW04-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905081
Date Extracted:	05/07/19	Lab ID:	905081-02 1/2
Date Analyzed:	05/08/19	Data File:	050810.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	109	31	160
Benzo(a)anthracene-d12	115	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	1.2
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.04
1-Methylnaphthalene	0.42
2-Methylnaphthalene	0.46

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	02MW07-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905081
Date Extracted:	05/07/19	Lab ID:	905081-05 1/2
Date Analyzed:	05/13/19	Data File:	051305.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	102	31	160
Benzo(a)anthracene-d12	114	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.4
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.04
1-Methylnaphthalene	<0.4
2-Methylnaphthalene	<0.4

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 905081
Date Extracted:	05/07/19	Lab ID:	09-1049 mb
Date Analyzed:	05/08/19	Data File:	050806.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	106	31	160
Benzo(a)anthracene-d12	116	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.2
Acenaphthylene	<0.02
Acenaphthene	<0.02
Fluorene	<0.02
Phenanthrene	<0.02
Anthracene	<0.02
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.02
1-Methylnaphthalene	<0.2
2-Methylnaphthalene	<0.2

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	02MW04-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905081
Date Extracted:	05/08/19	Lab ID:	905081-02
Date Analyzed:	05/08/19	Data File:	050840.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)
Hexane	160 ve
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1
1,2-Dibromoethane (EDB)	<1
Benzene	3.7
Toluene	<1
Ethylbenzene	44
m,p-Xylene	11
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	02MW04-050319	Client:	Floyd-Snider
Date Received:	05/03/19	Project:	Cantera-TOC, F&BI 905081
Date Extracted:	05/08/19	Lab ID:	905081-02 1/10
Date Analyzed:	05/10/19	Data File:	051020.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	90	50	150

Compounds:	Concentration ug/L (ppb)
Hexane	160

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera-TOC, F&BI 905081
Date Extracted:	05/08/19	Lab ID:	09-1023 mb
Date Analyzed:	05/08/19	Data File:	050816.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration ug/L (ppb)
Hexane	<1
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1
1,2-Dibromoethane (EDB)	<1
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Date of Report: 05/22/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905081

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING METHOD 8021B AND NWTPH-Gx

Laboratory Code: 905052-02 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	101	65-118
Toluene	ug/L (ppb)	50	98	72-122
Ethylbenzene	ug/L (ppb)	50	91	73-126
Xylenes	ug/L (ppb)	150	95	74-118
Gasoline	ug/L (ppb)	1,000	118	69-134

Date of Report: 05/22/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905081

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	97	104	61-133	7

Date of Report: 05/22/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905081

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 905120-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	6.71	98	94	75-115	4
Barium	ug/L (ppb)	50	17.4	100	99	75-115	1
Cadmium	ug/L (ppb)	5	<1	96	95	75-115	1
Chromium	ug/L (ppb)	20	<1	97	94	75-115	3
Selenium	ug/L (ppb)	5	<1	99	101	75-115	2
Silver	ug/L (ppb)	5	<1	91	90	75-115	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	96	80-120
Barium	ug/L (ppb)	50	97	80-120
Cadmium	ug/L (ppb)	5	95	80-120
Chromium	ug/L (ppb)	20	97	80-120
Selenium	ug/L (ppb)	5	100	80-120
Silver	ug/L (ppb)	5	97	80-120

Date of Report: 05/22/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905081

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 905120-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	<0.5 j	86	84	75-115	2
Silver	ug/L (ppb)	5	<0.32 j	91	90	75-115	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	93	80-120
Silver	ug/L (ppb)	5	97	80-120

Date of Report: 05/22/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905081

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: 905120-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	ug/L (ppb)	0.5	<0.1	121	119	71-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	ug/L (ppb)	0.5	99	79-120

Date of Report: 05/22/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905081

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	1	68	69	67-116	1
2-Methylnaphthalene	ug/L (ppb)	1	73	75	63-122	3
1-Methylnaphthalene	ug/L (ppb)	1	73	75	65-122	3
Acenaphthylene	ug/L (ppb)	1	79	79	65-119	0
Acenaphthene	ug/L (ppb)	1	77	76	66-118	1
Fluorene	ug/L (ppb)	1	84	83	64-125	1
Phenanthrene	ug/L (ppb)	1	84	82	67-120	2
Anthracene	ug/L (ppb)	1	86	84	65-122	2
Fluoranthene	ug/L (ppb)	1	90	89	65-127	1
Pyrene	ug/L (ppb)	1	90	97	62-130	7
Benz(a)anthracene	ug/L (ppb)	1	94	92	60-118	2
Chrysene	ug/L (ppb)	1	92	90	66-125	2
Benzo(b)fluoranthene	ug/L (ppb)	1	87	86	55-135	1
Benzo(k)fluoranthene	ug/L (ppb)	1	86	87	62-125	1
Benzo(a)pyrene	ug/L (ppb)	1	90	89	58-127	1
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	94	89	36-142	5
Dibenz(a,h)anthracene	ug/L (ppb)	1	89	85	37-133	5
Benzo(g,h,i)perylene	ug/L (ppb)	1	87	83	34-135	5

Date of Report: 05/22/19
Date Received: 05/03/19
Project: Cantera-TOC, F&BI 905081

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 905081-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Hexane	ug/L (ppb)	50	<1	89	44-139
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	78	68-125
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	90	70-119
Benzene	ug/L (ppb)	50	<0.35	83	75-114
Toluene	ug/L (ppb)	50	<1	87	73-117
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	<1	99	79-120
Ethylbenzene	ug/L (ppb)	50	<1	97	66-124
m,p-Xylene	ug/L (ppb)	100	<2	95	63-128
o-Xylene	ug/L (ppb)	50	<1	89	64-129

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Hexane	ug/L (ppb)	50	101	101	51-153	0
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	96	88	70-122	9
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	96	97	78-114	1
Benzene	ug/L (ppb)	50	94	93	75-116	1
Toluene	ug/L (ppb)	50	99	98	79-115	1
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	97	107	82-118	10
Ethylbenzene	ug/L (ppb)	50	97	98	83-111	1
m,p-Xylene	ug/L (ppb)	100	100	101	84-112	1
o-Xylene	ug/L (ppb)	50	98	94	81-117	4

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
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www.friedmanandbruya.com

August 20, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included is the amended report from the testing of material submitted on May 6, 2019 from the Cantera - TOC, F&BI 905119 project. The 8021B benzene reporting limit was lowered to meet QAPP requirements.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0517R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
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www.friedmanandbruya.com

May 17, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on May 6, 2019 from the Cantera - TOC, F&BI 905119 project. There are 14 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0517R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on May 6, 2019 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera - TOC, F&BI 905119 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
905119 -01	01MW101-050619
905119 -02	01MW102-050619
905119 -03	01MW103-050619
905119 -04	01MW1050-050619
905119 -05	Trip Blanks

The 8021B benzene reporting limit was reported below the lowest calibration point. The data were qualified accordingly.

The 8270D surrogate 2-fluorophenol did not pass the acceptance criteria in sample 01MW101-050619. The surrogate is not associated with pentachlorophenol, therefore the data were acceptable.

All other quality control requirements were acceptable.

Date of Report: 05/17/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905119
Date Extracted: 05/08/19
Date Analyzed: 05/08/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
01MW101-050619 905119-01	<100	107
01MW102-050619 905119-02	<100	108
Method Blank 09-836 mb	<100	107

Date of Report: 05/17/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905119
Date Extracted: 05/08/19
Date Analyzed: 05/08/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
01MW103-050619 905119-03	<0.35 j	<1	<1	4.8	140	88
01MW1050-050619 905119-04	<0.35 j	<1	<1	3.9	130	89
Trip Blanks 905119-05	<0.35 j	<1	<1	<3	<100	86
Method Blank 09-836 mb	<0.35 j	<1	<1	<3	<100	85

Date of Report: 05/17/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905119
Date Extracted: 05/10/19
Date Analyzed: 05/10/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 51-134)
01MW101-050619 905119-01	410 x	<250	79
01MW102-050619 905119-02 1/1.4	<70	<350	90
01MW103-050619 905119-03	9,400 x	1,900 x	85
01MW1050-050619 905119-04	6,700 x	1,500 x	78
Method Blank 09-1093 MB	<50	<250	105

Analysis for Semivolatile Phenols By EPA Method 8270D SIM

Client Sample ID:	01MW101-050619	Client:	Floyd-Snider
Date Received:	05/06/19	Project:	Cantera - TOC, F&BI 905119
Date Extracted:	05/07/19	Lab ID:	905119-01
Date Analyzed:	05/09/19	Data File:	050915.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	16 vo	17	97
Phenol-d6	24	10	62
2,4,6-Tribromophenol	106	33	166

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<0.2

Analysis for Semivolatile Phenols By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera - TOC, F&BI 905119
Date Extracted:	05/07/19	Lab ID:	09-1048 mb
Date Analyzed:	05/09/19	Data File:	050907.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	18	17	97
Phenol-d6	28	10	62
2,4,6-Tribromophenol	90	33	166

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<0.2

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	01MW101-050619	Client:	Floyd-Snider
Date Received:	05/06/19	Project:	Cantera - TOC, F&BI 905119
Date Extracted:	05/07/19	Lab ID:	905119-01 1/2
Date Analyzed:	05/08/19	Data File:	050817.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	115	31	160
Benzo(a)anthracene-d12	115	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.4
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.04
1-Methylnaphthalene	<0.4
2-Methylnaphthalene	<0.4

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	01MW102-050619	Client:	Floyd-Snider
Date Received:	05/06/19	Project:	Cantera - TOC, F&BI 905119
Date Extracted:	05/07/19	Lab ID:	905119-02 1/2
Date Analyzed:	05/08/19	Data File:	050818.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	115	31	160
Benzo(a)anthracene-d12	114	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.4
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.04
1-Methylnaphthalene	<0.4
2-Methylnaphthalene	<0.4

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera - TOC, F&BI 905119
Date Extracted:	05/07/19	Lab ID:	09-1049 mb
Date Analyzed:	05/08/19	Data File:	050806.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	106	31	160
Benzo(a)anthracene-d12	116	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.2
Acenaphthylene	<0.02
Acenaphthene	<0.02
Fluorene	<0.02
Phenanthrene	<0.02
Anthracene	<0.02
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.02
1-Methylnaphthalene	<0.2
2-Methylnaphthalene	<0.2

Date of Report: 05/17/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905119

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 905119-03 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	6.2	nm
Xylenes	ug/L (ppb)	4.8	<3	nm
Gasoline	ug/L (ppb)	140	150	7

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	103	65-118
Toluene	ug/L (ppb)	50	110	72-122
Ethylbenzene	ug/L (ppb)	50	110	73-126
Xylenes	ug/L (ppb)	150	105	74-118
Gasoline	ug/L (ppb)	1,000	99	69-134

Date of Report: 05/17/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905119

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	94	92	61-133	2

Date of Report: 05/17/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905119

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR SEMIVOLATILE PHENOLS BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 30)
Pentachlorophenol	ug/L (ppb)	2.5	71	88	23-185	21

Date of Report: 05/17/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905119

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	1	68	69	67-116	1
2-Methylnaphthalene	ug/L (ppb)	1	73	75	63-122	3
1-Methylnaphthalene	ug/L (ppb)	1	73	75	65-122	3
Acenaphthylene	ug/L (ppb)	1	79	79	65-119	0
Acenaphthene	ug/L (ppb)	1	77	76	66-118	1
Fluorene	ug/L (ppb)	1	84	83	64-125	1
Phenanthrene	ug/L (ppb)	1	84	82	67-120	2
Anthracene	ug/L (ppb)	1	86	84	65-122	2
Fluoranthene	ug/L (ppb)	1	90	89	65-127	1
Pyrene	ug/L (ppb)	1	90	97	62-130	7
Benz(a)anthracene	ug/L (ppb)	1	94	92	60-118	2
Chrysene	ug/L (ppb)	1	92	90	66-125	2
Benzo(b)fluoranthene	ug/L (ppb)	1	87	86	55-135	1
Benzo(k)fluoranthene	ug/L (ppb)	1	86	87	62-125	1
Benzo(a)pyrene	ug/L (ppb)	1	90	89	58-127	1
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	94	89	36-142	5
Dibenz(a,h)anthracene	ug/L (ppb)	1	89	85	37-133	5
Benzo(g,h,i)perylene	ug/L (ppb)	1	87	83	34-135	5

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

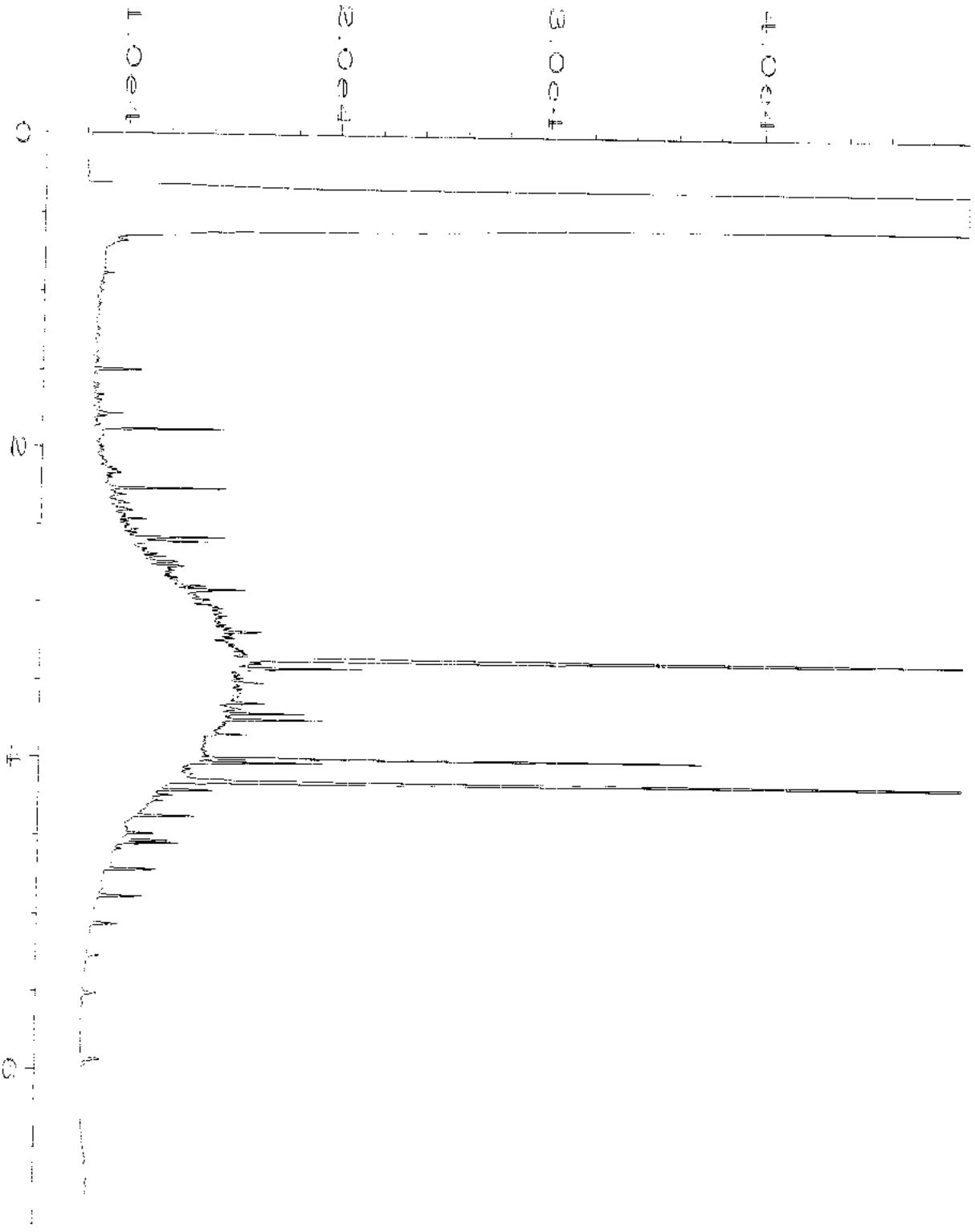
nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.



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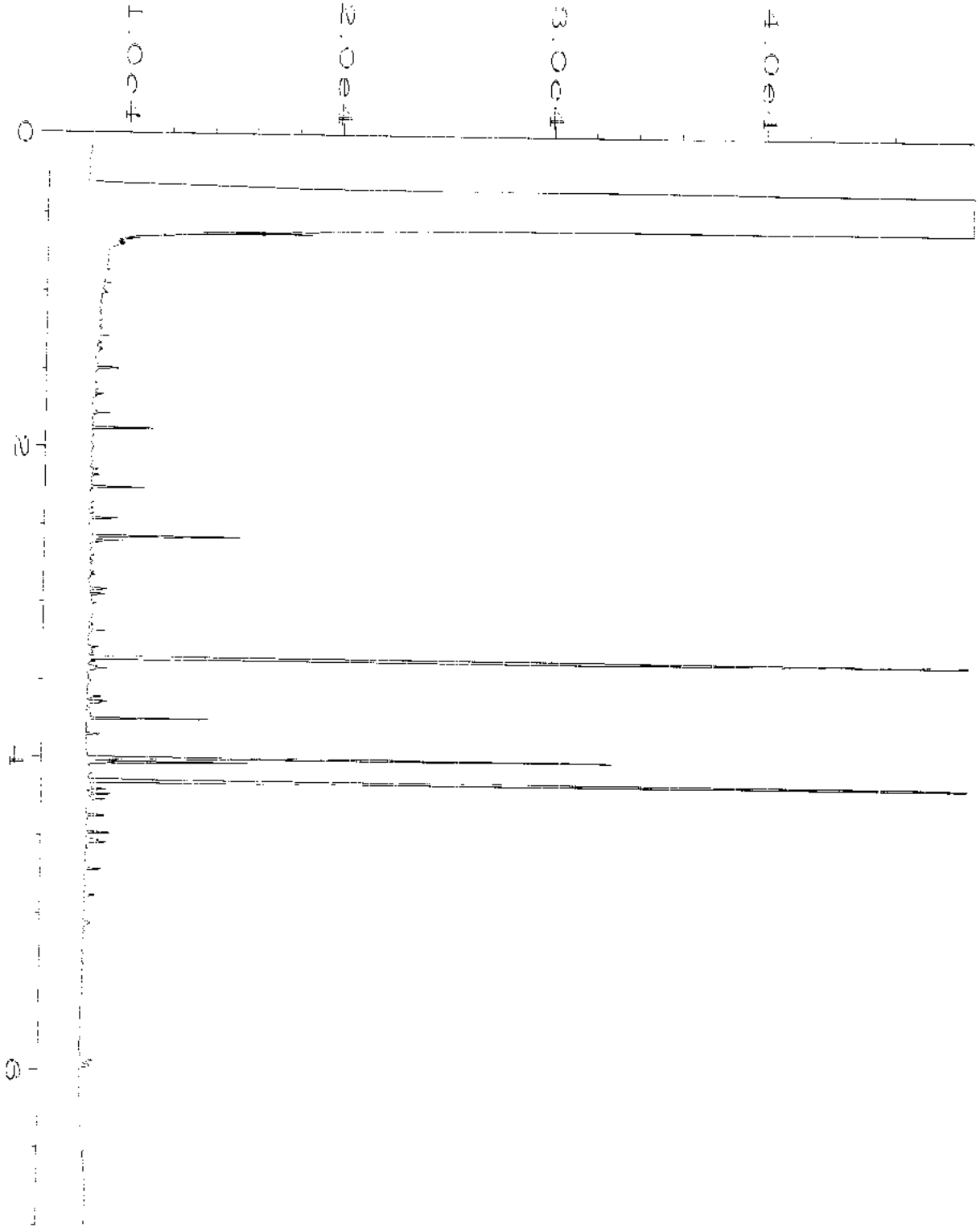
Operator : TL
Instrument : GC6
Sample Name : 905119-01
Run Time Bar Code:
Acquired on : 10 May 19 07:59 PM
Report Created on: 13 May 19 09:11 AM

Page Number : 1
Vial Number : 32
Injection Number : 1
Sequence Line : 8
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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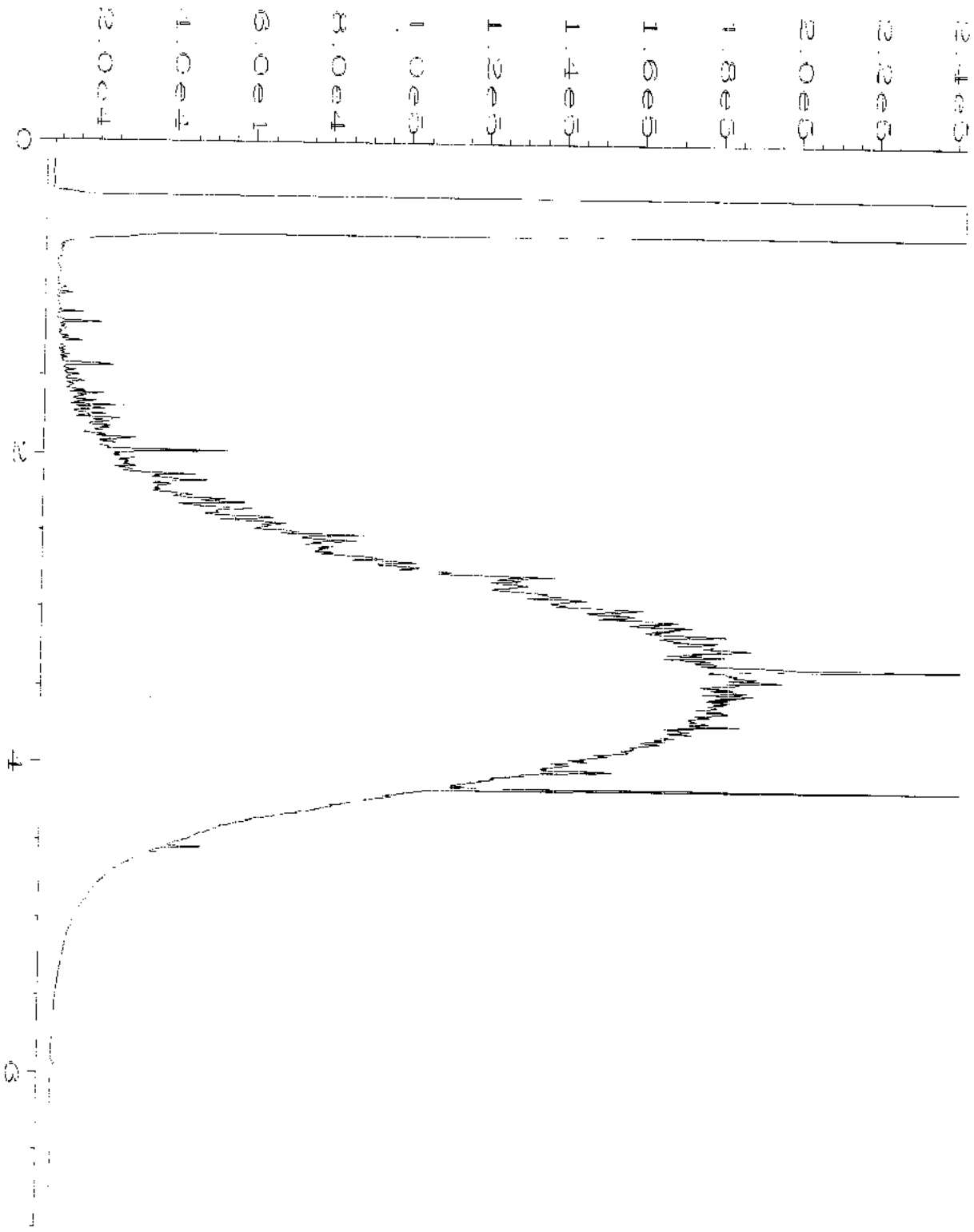
Instrument : GC6
Sample Name : 905119-02
Run Time Bar Code:
Acquired on : 10 May 19 08:10 PM
Report Created on: 13 May 19 09:11 AM

Page Number : 1
Vial Number : 33
Injection Number : 1
Sequence Line : 8
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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Instrument : GC6
Sample Name : 905119-03
Run Time Bar Code:
Acquired on : 10 May 19 08:21 PM
Report Created on: 13 May 19 09:12 AM

Page Number : 1
Vial Number : 34
Injection Number : 1
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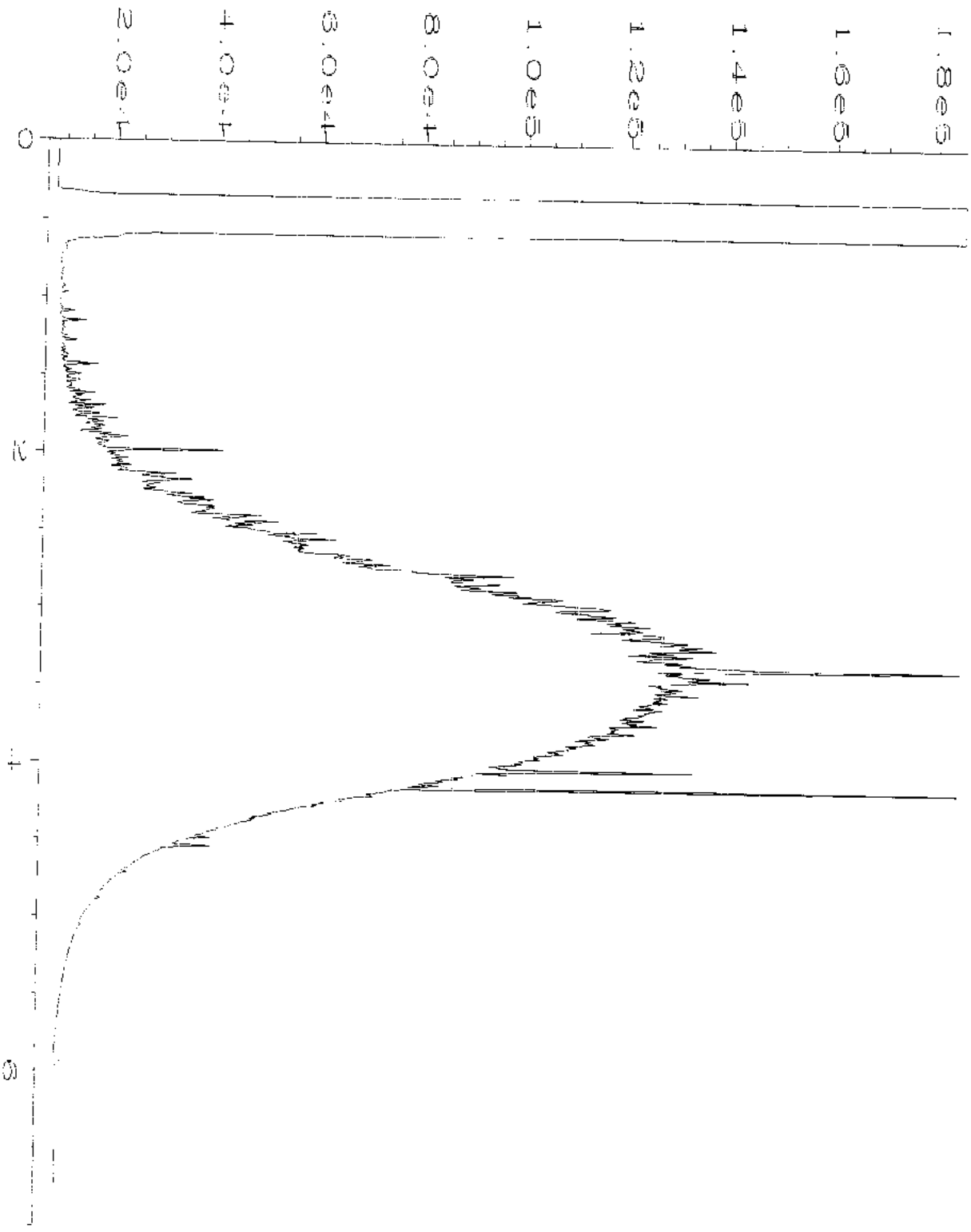
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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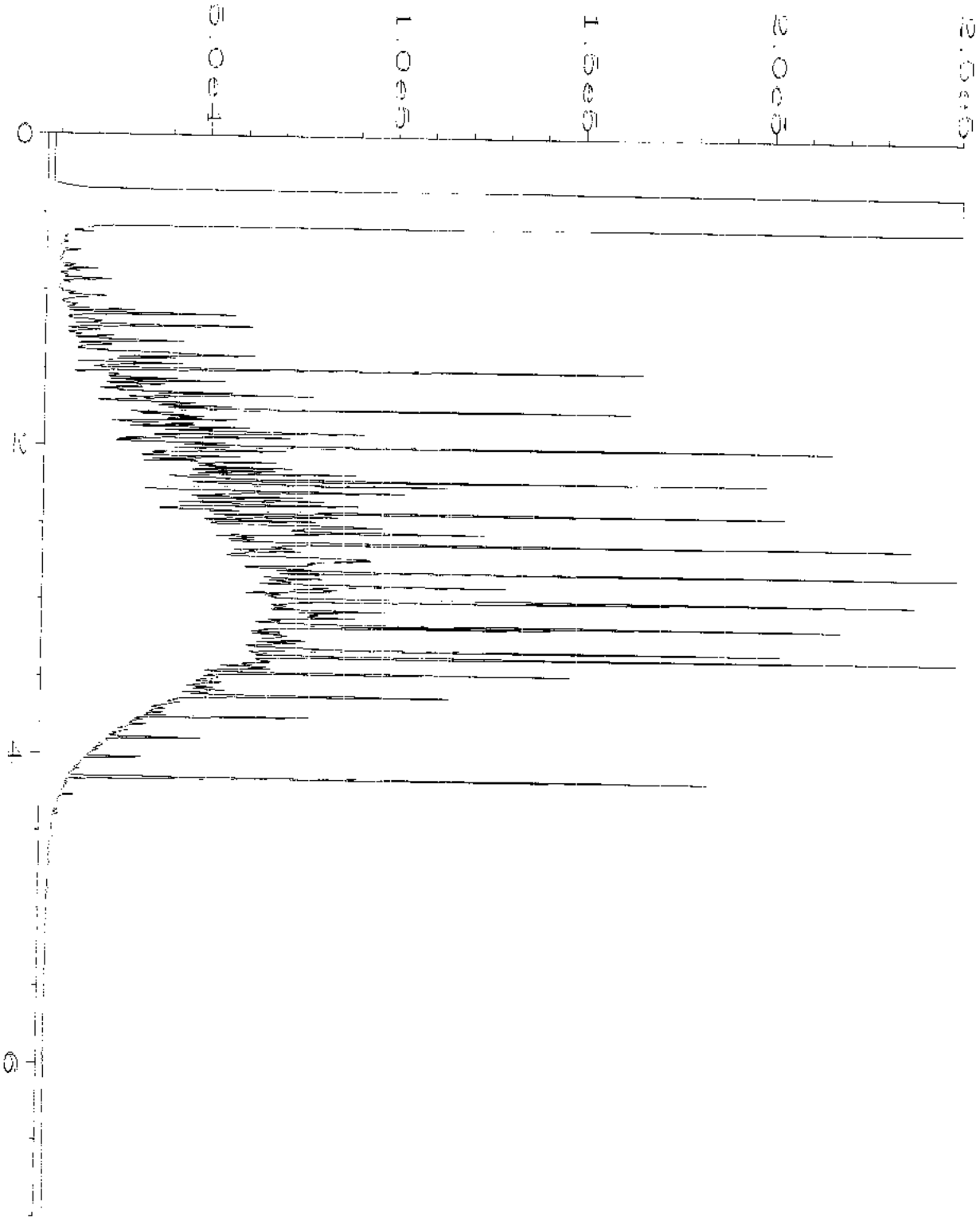
Instrument : GC6
Sample Name : 905119-04
Run Time Bar Code:
Acquired on : 10 May 19 08:33 PM
Report Created on: 13 May 19 09:13 AM

Page Number : 1
Vial Number : 35
Injection Number : 1
Sequence Line : 8
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\6\DATA\05-10-19\005F0501.D
Operator : TL
Instrument : GC6
Sample Name : 1000 Dx 57-31B
Run Time Bar Code:
Acquired on : 10 May 19 03:30 PM
Report Created on: 13 May 19 09:11 AM

Page Number : 1
Vial Number : 5
Injection Number : 1
Sequence Line : 5
Instrument Method: DX.MTH
Analysis Method : DX.MTH

905119

SAMPLE CHAIN OF CUSTODY

ME 05-06-19

Page # 1 of 1 DOY

Report To Lynn Grochala
Company Floyd Snider
Address 601 Union St, Ste 600
City, State, ZIP Seattle, WA 98101
Phone 206-292-2078 Email lynn.grochala@floydsnider.com

SAMPLERS (*signature*)

PROJECT NAME: Cantera - TOC
PO #:

REMARKS: Bulk Terminal
INVOICE TO:

TURNAROUND TIME
- [x] Standard Turnaround (VW3)
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Archive Samples
- [ ] Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	Penta				Notes
01 MW101-050619	01 A-G	5/6/19	1126	W	7		X	X				X	X				
01 MW102-050619	02 A-E		1127		5		X	X				X					
01 MW105-050619	03 A-D		1130		4		X	X	X								
01 MW1050-050619	04		1230		4		X	X	X								
trip blanks	05 A-C	↓	—	↓	3			X	X								

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Layni Waenter	Layni Waenter	Floyd|Snider	5/6/19	15:07
Received by: D. M-B	Liz Webber - Bruya	FSB	5/6/19	1507
Relinquished by:				
Received by:		Samples received at 4 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

September 13, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included is the amended report from the testing of material submitted on May 6, 2019 from the Cantera - TOC, F&BI 905120 project. The benzene and cadmium reporting limits were lowered.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0521R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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Seattle, WA 98119-2029
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www.friedmanandbruya.com

May 21, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on May 6, 2019 from the Cantera - TOC, F&BI 905120 project. There are 27 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0521R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on May 6, 2019 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera - TOC, F&BI 905120 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
905120 -01	02MW17-050619
905120 -02	02MW18-050619
905120 -03	02MW19-050619
905120 -04	02MW20-050619
905120 -05	02MW21-050619
905120 -06	02MW22-050619
905120 -07	Trip blanks

All quality control requirements were acceptable.

Date of Report: 05/21/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905120
Date Extracted: 05/07/19
Date Analyzed: 05/07/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
02MW18-050619 905120-02	<100	80
02MW19-050619 905120-03	<100	80
Method Blank 09-832 MB	<100	112

Date of Report: 05/21/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905120
Date Extracted: 05/07/19
Date Analyzed: 05/07/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
02MW17-050619 905120-01	<0.35 j	<1	<1	<3	<100	66
02MW20-050619 905120-04	<0.35 j	<1	<1	<3	<100	64
02MW21-050619 905120-05	<0.35 j	<1	<1	<3	<100	66
02MW22-050619 905120-06	<0.35 j	<1	<1	<3	<100	79
Trip blanks 905120-07	<0.35 j	<1	<1	<3	<100	66
Method Blank 09-832 MB	<0.35 j	<1	<1	<3	<100	89

Date of Report: 05/21/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905120
Date Extracted: 05/10/19
Date Analyzed: 05/10/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 51-134)
02MW17-050619 905120-01	220 x	<250	87
02MW18-050619 905120-02	190 x	<250	92
02MW19-050619 905120-03 1/1.2	380 x	<300	91
02MW20-050619 905120-04	210 x	<250	89
02MW21-050619 905120-05	75 x	<250	83
02MW22-050619 905120-06	80 x	<250	88
Method Blank 09-1093 MB	<50	<250	105

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW17-050619	Client:	Floyd-Snider
Date Received:	05/06/19	Project:	Cantera - TOC, F&BI 905120
Date Extracted:	05/07/19	Lab ID:	905120-01
Date Analyzed:	05/07/19	Data File:	905120-01.073
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.83
Barium	26.8
Chromium	<1
Selenium	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW18-050619	Client:	Floyd-Snider
Date Received:	05/06/19	Project:	Cantera - TOC, F&BI 905120
Date Extracted:	05/07/19	Lab ID:	905120-02
Date Analyzed:	05/07/19	Data File:	905120-02.074
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	3.62
Barium	36.7
Chromium	1.41
Selenium	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW19-050619	Client:	Floyd-Snider
Date Received:	05/06/19	Project:	Cantera - TOC, F&BI 905120
Date Extracted:	05/07/19	Lab ID:	905120-03
Date Analyzed:	05/07/19	Data File:	905120-03.075
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	22.6
Barium	70.9
Cadmium	<1
Chromium	2.43
Selenium	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW20-050619	Client:	Floyd-Snider
Date Received:	05/06/19	Project:	Cantera - TOC, F&BI 905120
Date Extracted:	05/07/19	Lab ID:	905120-04
Date Analyzed:	05/07/19	Data File:	905120-04.067
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	6.71
Barium	17.4
Chromium	<1
Selenium	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	NA	Project:	Cantera - TOC, F&BI 905120
Date Extracted:	05/07/19	Lab ID:	I9-298 mb
Date Analyzed:	05/07/19	Data File:	I9-298 mb.061
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	<1
Chromium	<1
Selenium	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW17-050619	Client:	Floyd-Snider
Date Received:	05/06/19	Project:	Cantera - TOC, F&BI 905120
Date Extracted:	05/07/19	Lab ID:	905120-01
Date Analyzed:	05/16/19	Data File:	905120-01.034
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Cadmium	<0.2
Lead	<0.5
Silver	<0.25

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW18-050619	Client:	Floyd-Snider
Date Received:	05/06/19	Project:	Cantera - TOC, F&BI 905120
Date Extracted:	05/07/19	Lab ID:	905120-02
Date Analyzed:	05/16/19	Data File:	905120-02.035
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Cadmium	<0.2
Lead	<0.5
Silver	<0.25

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW19-050619	Client:	Floyd-Snider
Date Received:	05/06/19	Project:	Cantera - TOC, F&BI 905120
Date Extracted:	05/07/19	Lab ID:	905120-03
Date Analyzed:	05/16/19	Data File:	905120-03.036
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Cadmium	<0.2
Lead	3.09
Silver	<0.25

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW20-050619	Client:	Floyd-Snider
Date Received:	05/06/19	Project:	Cantera - TOC, F&BI 905120
Date Extracted:	05/07/19	Lab ID:	905120-04
Date Analyzed:	05/16/19	Data File:	905120-04.066
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Cadmium	<0.2
Lead	<0.5
Silver	<0.25

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	NA	Project:	Cantera - TOC, F&BI 905120
Date Extracted:	05/07/19	Lab ID:	I9-298 mb
Date Analyzed:	05/16/19	Data File:	I9-298 mb.033
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Cadmium	<0.2
Lead	<0.5
Silver	<0.25

Date of Report: 05/21/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905120
Date Extracted: 05/15/19
Date Analyzed: 05/16/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Total Mercury
02MW17-050619 905120-01	<0.1
02MW18-050619 905120-02	<0.1
02MW19-050619 905120-03	<0.1
02MW20-050619 905120-04	<0.1
Method Blank i9-316 MB	<0.1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	02MW17-050619	Client:	Floyd-Snider
Date Received:	05/06/19	Project:	Cantera - TOC, F&BI 905120
Date Extracted:	05/07/19	Lab ID:	905120-01 1/2
Date Analyzed:	05/08/19	Data File:	050819.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	105	31	160
Benzo(a)anthracene-d12	115	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.4
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.04
1-Methylnaphthalene	<0.4
2-Methylnaphthalene	<0.4

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	02MW18-050619	Client:	Floyd-Snider
Date Received:	05/06/19	Project:	Cantera - TOC, F&BI 905120
Date Extracted:	05/07/19	Lab ID:	905120-02 1/2
Date Analyzed:	05/08/19	Data File:	050820.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	111	31	160
Benzo(a)anthracene-d12	119	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.4
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.04
1-Methylnaphthalene	<0.4
2-Methylnaphthalene	<0.4

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	02MW19-050619	Client:	Floyd-Snider
Date Received:	05/06/19	Project:	Cantera - TOC, F&BI 905120
Date Extracted:	05/07/19	Lab ID:	905120-03 1/2
Date Analyzed:	05/08/19	Data File:	050821.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	112	31	160
Benzo(a)anthracene-d12	123	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.4
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.04
1-Methylnaphthalene	<0.4
2-Methylnaphthalene	<0.4

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	02MW20-050619	Client:	Floyd-Snider
Date Received:	05/06/19	Project:	Cantera - TOC, F&BI 905120
Date Extracted:	05/07/19	Lab ID:	905120-04 1/2
Date Analyzed:	05/08/19	Data File:	050822.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	111	31	160
Benzo(a)anthracene-d12	113	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.4
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.04
1-Methylnaphthalene	<0.4
2-Methylnaphthalene	<0.4

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera - TOC, F&BI 905120
Date Extracted:	05/07/19	Lab ID:	09-1049 mb
Date Analyzed:	05/08/19	Data File:	050806.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	106	31	160
Benzo(a)anthracene-d12	116	25	165

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.2
Acenaphthylene	<0.02
Acenaphthene	<0.02
Fluorene	<0.02
Phenanthrene	<0.02
Anthracene	<0.02
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.02
1-Methylnaphthalene	<0.2
2-Methylnaphthalene	<0.2

Date of Report: 05/21/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905120

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 905052-02 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	101	65-118
Toluene	ug/L (ppb)	50	98	72-122
Ethylbenzene	ug/L (ppb)	50	91	73-126
Xylenes	ug/L (ppb)	150	95	74-118
Gasoline	ug/L (ppb)	1,000	118	69-134

Date of Report: 05/21/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905120

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	94	92	61-133	2

Date of Report: 05/21/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905120

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 905120-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	6.71	98	94	75-115	4
Barium	ug/L (ppb)	50	17.4	100	99	75-115	1
Cadmium	ug/L (ppb)	5	<1	96	95	75-115	1
Chromium	ug/L (ppb)	20	<1	97	94	75-115	3
Selenium	ug/L (ppb)	5	<1	99	101	75-115	2
Silver	ug/L (ppb)	5	<1	91	90	75-115	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	96	80-120
Barium	ug/L (ppb)	50	97	80-120
Cadmium	ug/L (ppb)	5	95	80-120
Chromium	ug/L (ppb)	20	97	80-120
Selenium	ug/L (ppb)	5	100	80-120
Silver	ug/L (ppb)	5	97	80-120

Date of Report: 05/21/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905120

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 905120-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	<0.5 j	86	84	75-115	2
Silver	ug/L (ppb)	5	<0.32 j	91	90	75-115	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	93	80-120
Silver	ug/L (ppb)	5	97	80-120

Date of Report: 05/21/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905120

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: 905120-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	ug/L (ppb)	0.5	<0.1	121	119	71-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	ug/L (ppb)	0.5	99	79-120

Date of Report: 05/21/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905120

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	1	68	69	67-116	1
2-Methylnaphthalene	ug/L (ppb)	1	73	75	63-122	3
1-Methylnaphthalene	ug/L (ppb)	1	73	75	65-122	3
Acenaphthylene	ug/L (ppb)	1	79	79	65-119	0
Acenaphthene	ug/L (ppb)	1	77	76	66-118	1
Fluorene	ug/L (ppb)	1	84	83	64-125	1
Phenanthrene	ug/L (ppb)	1	84	82	67-120	2
Anthracene	ug/L (ppb)	1	86	84	65-122	2
Fluoranthene	ug/L (ppb)	1	90	89	65-127	1
Pyrene	ug/L (ppb)	1	90	97	62-130	7
Benz(a)anthracene	ug/L (ppb)	1	94	92	60-118	2
Chrysene	ug/L (ppb)	1	92	90	66-125	2
Benzo(b)fluoranthene	ug/L (ppb)	1	87	86	55-135	1
Benzo(k)fluoranthene	ug/L (ppb)	1	86	87	62-125	1
Benzo(a)pyrene	ug/L (ppb)	1	90	89	58-127	1
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	94	89	36-142	5
Dibenz(a,h)anthracene	ug/L (ppb)	1	89	85	37-133	5
Benzo(g,h,i)perylene	ug/L (ppb)	1	87	83	34-135	5

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 22, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included is the amended report from the testing of material submitted on May 6, 2019 from the Cantera - TOC, F&BI 905121 project. The 8260C TCE reporting limits were lowered to meet the QAPP requirements.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0515R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

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May 15, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on May 6, 2019 from the Cantera - TOC, F&BI 905121 project. There are 5 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0515R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on May 6, 2019 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera - TOC, F&BI 905121 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
905121 -01	01MW107-050619

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW107-050619	Client:	Floyd-Snider
Date Received:	05/06/19	Project:	Cantera - TOC, F&BI 905121
Date Extracted:	05/08/19	Lab ID:	905121-01
Date Analyzed:	05/08/19	Data File:	050839.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera - TOC, F&BI 905121
Date Extracted:	05/08/19	Lab ID:	09-1023 mb
Date Analyzed:	05/08/19	Data File:	050816.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Date of Report: 05/15/19
Date Received: 05/06/19
Project: Cantera - TOC, F&BI 905121

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 905081-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	50	<0.2	64	61-139
Chloroethane	ug/L (ppb)	50	<1	66	55-149
1,1-Dichloroethene	ug/L (ppb)	50	<1	73	71-123
Methylene chloride	ug/L (ppb)	50	<5	75	61-126
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	76	72-122
1,1-Dichloroethane	ug/L (ppb)	50	<1	81	79-113
cis-1,2-Dichloroethene	ug/L (ppb)	50	<1	86	63-126
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	90	70-119
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	87	75-121
Trichloroethene	ug/L (ppb)	50	<0.5	86	73-122
Tetrachloroethene	ug/L (ppb)	50	<1	87	72-113

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	100	93	70-128	7
Chloroethane	ug/L (ppb)	50	95	87	66-149	9
1,1-Dichloroethene	ug/L (ppb)	50	89	82	75-119	8
Methylene chloride	ug/L (ppb)	50	89	82	63-132	8
trans-1,2-Dichloroethene	ug/L (ppb)	50	93	87	76-118	7
1,1-Dichloroethane	ug/L (ppb)	50	93	87	77-119	7
cis-1,2-Dichloroethene	ug/L (ppb)	50	107	100	76-119	7
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	96	97	78-114	1
1,1,1-Trichloroethane	ug/L (ppb)	50	102	95	80-116	7
Trichloroethene	ug/L (ppb)	50	95	95	72-119	0
Tetrachloroethene	ug/L (ppb)	50	99	102	78-109	3

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

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L - The reported concentration was generated from a library search.

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ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

905121

SAMPLE CHAIN OF CUSTODY

MC 05-06-19

VW1

Report To Lynn Grochala
Company Floyd | Snider
Address 601 Union St, Ste 600
City, State, ZIP Seattle, WA 98101
Phone 206-292-2078 Email lynn.grochala@floydsnider.com

SAMPLERS (*signature*)

Page # 1 of 1

PROJECT NAME: Cantera – TOC

PO #

REMARKS: ASKD

INVOICE TO

TURNAROUND TIME
- [x] Standard Turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Archive Samples
- [ ] Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	cVOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM					Notes
01 MW107-050619	01A-C		1205							X							

ANALYSES REQUESTED

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Layni Waemter	Layni Waemter	Floyd|Snider	5/6/19	15:07
Received by: D. Mbz	Liz Webber-Bruya	F:B1	5/6/19	15:07
Relinquished by:		Samples received at 4 °C		
Received by:				

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Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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September 13, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included is the amended report from the testing of material submitted on May 14, 2019 from the Cantera, F&BI 905289 project. The TCE reporting limit was lowered.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kristin Anderson
FDS0531R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
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May 31, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on May 14, 2019 from the Cantera, F&BI 905289 project. There are 17 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kristin Anderson
FDS0531R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on May 14, 2019 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera, F&BI 905289 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
905289 -01	01MW92-051419
905289 -02	01MW93-051419
905289 -03	01MW97-051419
905289 -04	01MW197-051419
905289 -05	01MW94-051419
905289 -06	01MW96-051419
905289 -07	01MW95-051419
905289 -08	01MW98-051419

The NWTPH-Gx concentrations reported for 01MW92-051419 and 01MW98-051419 are elevated due to the high concentration of trichloroethene present in the samples. The data were qualified accordingly.

The NWTPH-Dx concentrations for sample 01MW97-051419 were lowered below the standard reporting limit due to limited sample volume. The data were flagged accordingly.

All other quality control requirements were acceptable.

Date of Report: 05/31/19
Date Received: 05/14/19
Project: Cantera, F&BI 905289
Date Extracted: 05/15/19
Date Analyzed: 05/15/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
01MW92-051419 905289-01	1,500 x	82
01MW93-051419 905289-02	<100	83
01MW98-051419 905289-08	370 x	84
Method Blank 09-844 MB	<100	89

Date of Report: 05/31/19
Date Received: 05/14/19
Project: Cantera, F&BI 905289
Date Extracted: 05/15/19 and 05/24/19
Date Analyzed: 05/15/19 and 05/24/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 51-134)
01MW92-051419 905289-01	4,600	1,300 x	73
01MW93-051419 905289-02	54	<250	93
01MW97-051419 905289-03,04 1/2.5	65 j	<250 j	86
01MW94-051419 905289-05	<50	<250	88
01MW96-051419 905289-06	2,100	450 x	82
01MW98-051419 905289-08	3,600	1,300 x	75
Method Blank 09-1112 MB2	<50	<250	85
Method Blank 09-1230 MB	<50	<250	103

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW92-051419	Client:	Floyd-Snider
Date Received:	05/14/19	Project:	Cantera, F&BI 905289
Date Extracted:	05/17/19	Lab ID:	905289-01 1/200
Date Analyzed:	05/17/19	Data File:	051748.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	57	121
Toluene-d8	113	63	127
4-Bromofluorobenzene	95	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<40
Chloroethane	<200
1,1-Dichloroethene	<200
Methylene chloride	<1,000
trans-1,2-Dichloroethene	<200
1,1-Dichloroethane	<200
cis-1,2-Dichloroethene	570
1,2-Dichloroethane (EDC)	<200
1,1,1-Trichloroethane	<200
Benzene	<70
Trichloroethene	5,200
Toluene	<200
Tetrachloroethene	<200
Ethylbenzene	<200
m,p-Xylene	<400
o-Xylene	<200

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW93-051419	Client:	Floyd-Snider
Date Received:	05/14/19	Project:	Cantera, F&BI 905289
Date Extracted:	05/16/19	Lab ID:	905289-02
Date Analyzed:	05/17/19	Data File:	051745.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	108	57	121
Toluene-d8	113	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW97-051419	Client:	Floyd-Snider
Date Received:	05/14/19	Project:	Cantera, F&BI 905289
Date Extracted:	05/16/19	Lab ID:	905289-03
Date Analyzed:	05/17/19	Data File:	051746.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	57	121
Toluene-d8	114	63	127
4-Bromofluorobenzene	96	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	20
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	56
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW197-051419	Client:	Floyd-Snider
Date Received:	05/14/19	Project:	Cantera, F&BI 905289
Date Extracted:	05/16/19	Lab ID:	905289-04
Date Analyzed:	05/17/19	Data File:	051738.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	57	121
Toluene-d8	111	63	127
4-Bromofluorobenzene	98	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	19
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	54
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW94-051419	Client:	Floyd-Snider
Date Received:	05/14/19	Project:	Cantera, F&BI 905289
Date Extracted:	05/16/19	Lab ID:	905289-05
Date Analyzed:	05/17/19	Data File:	051739.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	57	121
Toluene-d8	111	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW96-051419	Client:	Floyd-Snider
Date Received:	05/14/19	Project:	Cantera, F&BI 905289
Date Extracted:	05/17/19	Lab ID:	905289-06
Date Analyzed:	05/17/19	Data File:	051743.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	57	121
Toluene-d8	113	63	127
4-Bromofluorobenzene	96	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	6.0
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	3.1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Benzene	1.3
Trichloroethene	1.5
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW95-051419	Client:	Floyd-Snider
Date Received:	05/14/19	Project:	Cantera, F&BI 905289
Date Extracted:	05/16/19	Lab ID:	905289-07
Date Analyzed:	05/17/19	Data File:	051740.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	57	121
Toluene-d8	112	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	01MW98-051419	Client:	Floyd-Snider
Date Received:	05/14/19	Project:	Cantera, F&BI 905289
Date Extracted:	05/16/19	Lab ID:	905289-08 1/10
Date Analyzed:	05/17/19	Data File:	051747.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	57	121
Toluene-d8	114	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<2
Chloroethane	<10
1,1-Dichloroethene	<10
Methylene chloride	<50
trans-1,2-Dichloroethene	<10
1,1-Dichloroethane	<10
cis-1,2-Dichloroethene	57
1,2-Dichloroethane (EDC)	<10
1,1,1-Trichloroethane	<10
Trichloroethene	810
Tetrachloroethene	<10

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Cantera, F&BI 905289
Date Extracted:	05/16/19	Lab ID:	09-1126 mb
Date Analyzed:	05/16/19	Data File:	051612.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Benzene	<0.35
Trichloroethene	<0.5
Toluene	<1
Tetrachloroethene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1

Date of Report: 05/31/19
Date Received: 05/14/19
Project: Cantera, F&BI 905289

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 905289-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	1,500	1,500	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	88	69-134

Date of Report: 05/31/19
Date Received: 05/14/19
Project: Cantera, F&BI 905289

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	104	112	58-134	7

Date of Report: 05/31/19
Date Received: 05/14/19
Project: Cantera, F&BI 905289

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	102	122	58-134	18

Date of Report: 05/31/19
Date Received: 05/14/19
Project: Cantera, F&BI 905289

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	108	110	50-154	2
Chloroethane	ug/L (ppb)	50	104	106	58-146	2
1,1-Dichloroethene	ug/L (ppb)	50	107	108	67-136	1
Methylene chloride	ug/L (ppb)	50	96	97	39-148	1
trans-1,2-Dichloroethene	ug/L (ppb)	50	109	111	68-128	2
1,1-Dichloroethane	ug/L (ppb)	50	100	102	79-121	2
cis-1,2-Dichloroethene	ug/L (ppb)	50	104	106	80-123	2
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	93	94	73-132	1
1,1,1-Trichloroethane	ug/L (ppb)	50	106	109	83-130	3
Benzene	ug/L (ppb)	50	101	102	69-134	1
Trichloroethene	ug/L (ppb)	50	99	100	80-120	1
Toluene	ug/L (ppb)	50	97	98	72-122	1
Tetrachloroethene	ug/L (ppb)	50	99	99	76-121	0
Ethylbenzene	ug/L (ppb)	50	100	101	77-124	1
m,p-Xylene	ug/L (ppb)	100	101	102	83-125	1
o-Xylene	ug/L (ppb)	50	98	99	81-121	1

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

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fbi@isomedia.com
www.friedmanandbruya.com

September 13, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the amended results from the testing of material submitted on July 25, 2019 from the Cantera TOC, F&BI 907486 project. The 8021B benzene reporting limit was lowered.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0805R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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www.friedmanandbruya.com

August 5, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on July 25, 2019 from the Cantera TOC, F&BI 907486 project. There are 32 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0805R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on July 25, 2019 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera TOC, F&BI 907486 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
907486 -01	01MW105-072519
907486 -02	01MW110-072519
907486 -03	01MW111-072519
907486 -04	02MW07-072519
907486 -05	02MW18-072519
907486 -06	02MW19-072519
907486 -07	02MW20-072519

The 6020B silver concentration was reported beween the method detection limit and the reporting limit. The data were flagged accordingly.

Mercury in the 6020A matrix spike and matrix spike duplicate failed the acceptance criteria. The laboratory control sample passed the acceptance criteria, therefore the results were due to matrix effect.

All other quality control requirements were acceptable.

Date of Report: 08/05/19
Date Received: 07/25/19
Project: Cantera TOC, F&BI 907486
Date Extracted: 07/26/19
Date Analyzed: 07/26/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
01MW105-072519 907486-01	<0.35 j	<1	<1	<3	<100	89
01MW110-072519 907486-02	<0.35 j	<1	<1	<3	<100	89
01MW111-072519 907486-03	<0.35 j	<1	<1	<3	<100	89
Method Blank 09-1769 MB	<0.35 j	<1	<1	<3	<100	91

Date of Report: 08/05/19
Date Received: 07/25/19
Project: Cantera TOC, F&BI 907486
Date Extracted: 07/26/19
Date Analyzed: 07/31/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx
Sample Extracts Passed Through a Silica Gel Column Prior to Analysis
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 47-140)
01MW110-072519 907486-02	50	<250	98
01MW111-072519 907486-03	380 x	1,500	82
Method Blank 09-1799 MB	<50	<250	98

Date of Report: 08/05/19
Date Received: 07/25/19
Project: Cantera TOC, F&BI 907486
Date Extracted: 07/26/19
Date Analyzed: 07/26/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 51-134)
01MW105-072519 907486-01	120 x	<250	85
01MW110-072519 907486-02	620 x	<250	91
01MW111-072519 907486-03	480 x	1,800	83
Method Blank 09-1799 MB	<50	<250	97

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	02MW07-072519	Client:	Floyd-Snider
Date Received:	07/25/19	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/29/19	Lab ID:	907486-04
Date Analyzed:	07/30/19	Data File:	907486-04.048
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	3.72
Barium	33.6
Cadmium	<0.2
Chromium	<1
Lead	<0.5
Selenium	<1

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	02MW07-072519	Client:	Floyd-Snider
Date Received:	07/25/19	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/29/19	Lab ID:	907486-04
Date Analyzed:	07/31/19	Data File:	907486-04.042
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Mercury	<0.25
Silver	<0.1 j

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	02MW18-072519	Client:	Floyd-Snider
Date Received:	07/25/19	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/29/19	Lab ID:	907486-05
Date Analyzed:	07/30/19	Data File:	907486-05.052
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.88
Barium	28.2
Cadmium	<0.2
Chromium	<1
Lead	<0.5
Selenium	<1

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	02MW18-072519	Client:	Floyd-Snider
Date Received:	07/25/19	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/29/19	Lab ID:	907486-05
Date Analyzed:	07/31/19	Data File:	907486-05.045
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Mercury	<0.25
Silver	<0.1 j

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	02MW19-072519	Client:	Floyd-Snider
Date Received:	07/25/19	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/29/19	Lab ID:	907486-06
Date Analyzed:	07/30/19	Data File:	907486-06.053
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	14.3
Barium	61.9
Cadmium	<0.2
Chromium	<1
Lead	<0.5
Selenium	<1

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	02MW19-072519	Client:	Floyd-Snider
Date Received:	07/25/19	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/29/19	Lab ID:	907486-06
Date Analyzed:	07/31/19	Data File:	907486-06.046
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Mercury	<0.25
Silver	<0.1 j

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	02MW20-072519	Client:	Floyd-Snider
Date Received:	07/25/19	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/29/19	Lab ID:	907486-07
Date Analyzed:	07/30/19	Data File:	907486-07.054
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	12.2
Barium	20.7
Cadmium	<0.2
Chromium	<1
Lead	<0.5
Selenium	<1

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	02MW20-072519	Client:	Floyd-Snider
Date Received:	07/25/19	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/29/19	Lab ID:	907486-07
Date Analyzed:	07/31/19	Data File:	907486-07.047
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Mercury	<0.25
Silver	<0.1 j

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	NA	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/29/19	Lab ID:	I9-457 mb
Date Analyzed:	07/30/19	Data File:	I9-457 mb.040
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	<1
Cadmium	<0.2
Chromium	<1
Lead	<0.5
Selenium	<1

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	NA	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/29/19	Lab ID:	I9-457 mb
Date Analyzed:	07/31/19	Data File:	I9-457 mb.034
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Mercury	<0.25
Silver	<0.1 j

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW07-072519	Client:	Floyd-Snider
Date Received:	07/25/19	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/26/19	Lab ID:	907486-04
Date Analyzed:	07/30/19	Data File:	907486-04.057
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	3.91
Barium	34.9
Cadmium	<0.2
Chromium	<1
Lead	<0.5
Selenium	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW07-072519	Client:	Floyd-Snider
Date Received:	07/25/19	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/26/19	Lab ID:	907486-04
Date Analyzed:	07/31/19	Data File:	907486-04.036
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Mercury	<0.25
Silver	<0.1 j

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW18-072519	Client:	Floyd-Snider
Date Received:	07/25/19	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/26/19	Lab ID:	907486-05
Date Analyzed:	07/30/19	Data File:	907486-05.058
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.93
Barium	29.1
Cadmium	<0.2
Chromium	<1
Lead	<0.5
Selenium	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW18-072519	Client:	Floyd-Snider
Date Received:	07/25/19	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/26/19	Lab ID:	907486-05
Date Analyzed:	07/31/19	Data File:	907486-05.048
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Mercury	<0.25
Silver	<0.1 j

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW19-072519	Client:	Floyd-Snider
Date Received:	07/25/19	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/26/19	Lab ID:	907486-06
Date Analyzed:	07/30/19	Data File:	907486-06.062
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	14.4
Barium	60.0
Cadmium	<0.2
Chromium	<1
Lead	<0.5
Selenium	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW19-072519	Client:	Floyd-Snider
Date Received:	07/25/19	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/26/19	Lab ID:	907486-06
Date Analyzed:	07/31/19	Data File:	907486-06.049
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Mercury	<0.25
Silver	<0.1 j

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW20-072519	Client:	Floyd-Snider
Date Received:	07/25/19	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/26/19	Lab ID:	907486-07
Date Analyzed:	07/30/19	Data File:	907486-07.063
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	11.8
Barium	20.0
Cadmium	<0.2
Chromium	<1
Lead	<0.5
Selenium	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	02MW20-072519	Client:	Floyd-Snider
Date Received:	07/25/19	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/26/19	Lab ID:	907486-07
Date Analyzed:	07/31/19	Data File:	907486-07.055
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Mercury	<0.25
Silver	<0.1 j

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	NA	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/26/19	Lab ID:	I9-455 mb
Date Analyzed:	07/30/19	Data File:	I9-455 mb.055
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	<1
Cadmium	<0.2
Chromium	<1
Lead	<0.5
Selenium	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	NA	Project:	Cantera TOC, F&BI 907486
Date Extracted:	07/26/19	Lab ID:	I9-455 mb
Date Analyzed:	07/31/19	Data File:	I9-455 mb.050
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Mercury	<0.25
Silver	<0.1 j

Date of Report: 08/05/19
Date Received: 07/25/19
Project: Cantera TOC, F&BI 907486

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 907474-06 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	7.1	7.3	3
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	3.3	3.6	7
Xylenes	ug/L (ppb)	15	16	4
Gasoline	ug/L (ppb)	1,600	1,700	5

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	94	65-118
Toluene	ug/L (ppb)	50	95	72-122
Ethylbenzene	ug/L (ppb)	50	96	73-126
Xylenes	ug/L (ppb)	150	95	74-118
Gasoline	ug/L (ppb)	1,000	96	69-134

Date of Report: 08/05/19
Date Received: 07/25/19
Project: Cantera TOC, F&BI 907486

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	80	80	61-133	0

Date of Report: 08/05/19
Date Received: 07/25/19
Project: Cantera TOC, F&BI 907486

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	76	80	58-134	5

Date of Report: 08/05/19
Date Received: 07/25/19
Project: Cantera TOC, F&BI 907486

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED METALS USING EPA METHOD 6020B

Laboratory Code: 907486-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	3.72	107	106	75-125	1
Barium	ug/L (ppb)	50	33.6	108	109	75-125	1
Cadmium	ug/L (ppb)	5	<0.2	100	101	75-125	1
Chromium	ug/L (ppb)	20	<1	102	103	75-125	1
Lead	ug/L (ppb)	10	<1	87	88	75-125	1
Selenium	ug/L (ppb)	5	<1	108	107	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	106	80-120
Barium	ug/L (ppb)	50	96	80-120
Cadmium	ug/L (ppb)	5	98	80-120
Chromium	ug/L (ppb)	20	96	80-120
Lead	ug/L (ppb)	10	97	80-120
Selenium	ug/L (ppb)	5	107	80-120

Date of Report: 08/05/19
Date Received: 07/25/19
Project: Cantera TOC, F&BI 907486

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED METALS USING EPA METHOD 6020B

Laboratory Code: 907486-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	ug/L (ppb)	5	<0.25	69 vo	69 vo	75-125	0
Silver	ug/L (ppb)	5	<0.1 j	83	82	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	ug/L (ppb)	5	93	80-120
Silver	ug/L (ppb)	5	96	80-120

Date of Report: 08/05/19
Date Received: 07/25/19
Project: Cantera TOC, F&BI 907486

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 907486-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	11.8	74	78	70-130	5
Barium	ug/L (ppb)	50	20.0	17 b	23 b	70-130	30 b
Cadmium	ug/L (ppb)	5	<0.2	94	98	70-130	4
Chromium	ug/L (ppb)	20	<1	91	93	70-130	2
Lead	ug/L (ppb)	10	<1	87	89	70-130	2
Selenium	ug/L (ppb)	5	<1	98	108	70-130	10

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	100	85-115
Barium	ug/L (ppb)	50	98	85-115
Cadmium	ug/L (ppb)	5	98	85-115
Chromium	ug/L (ppb)	20	96	85-115
Lead	ug/L (ppb)	10	93	85-115
Selenium	ug/L (ppb)	5	101	85-115

Date of Report: 08/05/19
Date Received: 07/25/19
Project: Cantera TOC, F&BI 907486

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 907486-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	ug/L (ppb)	5	<0.25	81	81	75-125	0
Silver	ug/L (ppb)	5	<0.1 j	84	85	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	ug/L (ppb)	5	86	80-120
Silver	ug/L (ppb)	5	95	80-120

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 9, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the additional results from the testing of material submitted on July 25, 2019 from the Cantera TOC, F&BI 907486 project. There are 6 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
FDS0809R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on July 25, 2019 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera TOC, F&BI 907486 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
907486 -01	01MW105-072519
907486 -02	01MW110-072519
907486 -03	01MW111-072519
907486 -04	02MW07-072519
907486 -05	02MW18-072519
907486 -06	02MW19-072519
907486 -07	02MW20-072519

All quality control requirements were acceptable.

Date of Report: 08/09/19
Date Received: 07/25/19
Project: Cantera TOC, F&BI 907486
Date Extracted: 08/05/19
Date Analyzed: 08/06/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED MERCURY USING EPA METHOD 1631E

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Dissolved Mercury
02MW07-072519 907486-04	<0.1
02MW18-072519 907486-05	<0.1
02MW19-072519 907486-06	<0.1
02MW20-072519 907486-07	<0.1
Method Blank	<0.1

Date of Report: 08/09/19
Date Received: 07/25/19
Project: Cantera TOC, F&BI 907486
Date Extracted: 08/05/19
Date Analyzed: 08/06/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Total Mercury
02MW07-072519 907486-04	<0.1
02MW18-072519 907486-05	<0.1
02MW19-072519 907486-06	<0.1
02MW20-072519 907486-07	<0.1
Method Blank	<0.1

Date of Report: 08/09/19
Date Received: 07/25/19
Project: Cantera TOC, F&BI 907486

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED MERCURY USING EPA METHOD 1631E

Laboratory Code: 907486-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	ug/L (ppb)	0.5	<0.1	119	119	71-125	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	ug/L (ppb)	0.5	105	78-125

Date of Report: 08/09/19
Date Received: 07/25/19
Project: Cantera TOC, F&BI 907486

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: 907486-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	ug/L (ppb)	0.5	<0.1	119	119	71-125	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	ug/L (ppb)	0.5	105	78-125

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

907486

SAMPLE CHAIN OF CUSTODY

MC 07-25-19

VW3

Report To Lyra Gracchia

Company Floyd|Snider

Address 601 Union Street Suite 600

City, State, ZIP Seattle, WA 98101

Phone 206-292-2678 Email

SAMPLERS (signature)

PROJECT NAME: Cantora TOC

PO #

REMARKS: 72 hr TAT

INVOICE TO

Page # of

TURNAROUND TIME AI 4

☐ Standard Turnaround

☑ RUSH 72 hour BOS

Rush charges authorized by:

SAMPLE DISPOSAL

☐ Dispose after 30 days

☐ Archive Samples

☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	RCRA 8 Metals (dissolved)	RCRA 8 Metals (total)	Dx w/SG	Hg by 1631	(Total & Dissolved)	Notes
01MW105-072519	01A-D	7/25/19	12:00	GW	4		X	X	X								◆	perkA efls
01MW110-072519	02		12:53		4		X	X	X						◆			7/31/19
01MW111-072519	03		14:34		4		X	X	X						◆			MC
02MW07-072519	04 A-B		11:16		2								X	X		✓		✓-cl
02MW18-072519	05		10:50		2								X	X		✓		9/5/19
02MW19-072519	06		10:26		2								X	X		✓		
02MW20-072519	07		9:30		2								X	X		✓		
Trip Blank	08A-B																	

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Adia Jumper	Floyd|Snider	7/25/19	15:40
Received by:	Nhan Phan	FEBI	7/25/19	1540
Relinquished by:				
Received by:		Samples received at 3 °C		

Friedman & Bruya, Inc.

3012 16th Avenue West

Seattle, WA 98119-2029

Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
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Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

September 4, 2019

Lynn Grochala, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Ms Grochala:

Included are the results from the testing of material submitted on August 29, 2019 from the Cantera-TOC, F&BI 908594 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kristin Anderson
FDS0904R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on August 29, 2019 by Friedman & Bruya, Inc. from the Floyd-Snider Cantera-TOC, F&BI 908594 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
908594 -01	01MW110-082919
908594 -02	01MW105-082919
908594 -03	01MW111-082919
908594 -04	01MW1110-082919

All quality control requirements were acceptable.

Date of Report: 09/04/19
Date Received: 08/29/19
Project: Cantera-TOC, F&BI 908594
Date Extracted: 08/29/19
Date Analyzed: 08/30/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx
Sample Extracts Passed Through a Silica Gel Column Prior to Analysis
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
01MW110-082919 908594-01	<50	<250	80
01MW105-082919 908594-02	110	<250	77
01MW111-082919 908594-03	<50	<250	66
01MW1110-082919 908594-04	<50	<250	80
Method Blank 09-2149 MB	<50	<250	100

Date of Report: 09/04/19
Date Received: 08/29/19
Project: Cantera-TOC, F&BI 908594

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	71	75	63-142	5

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

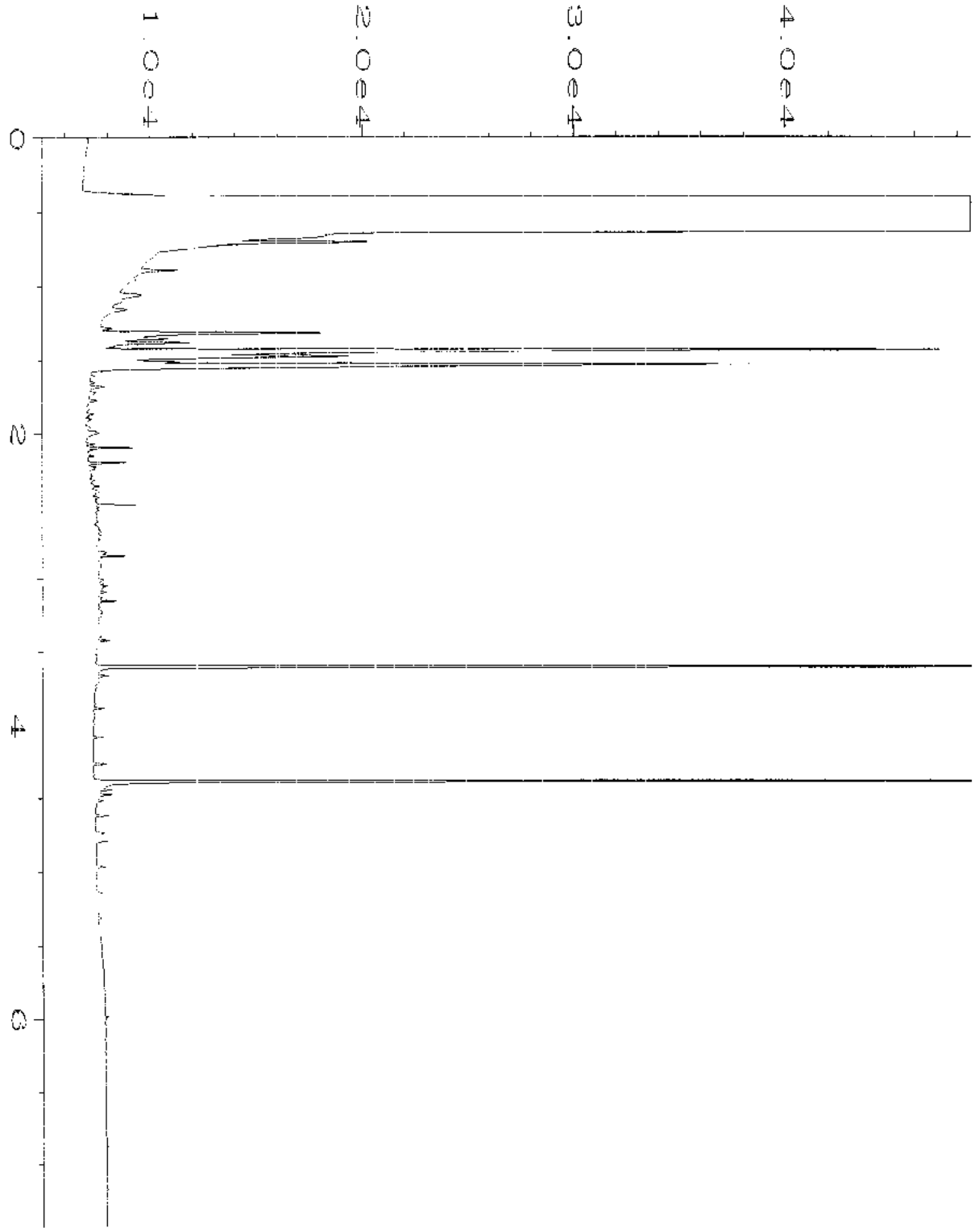
nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

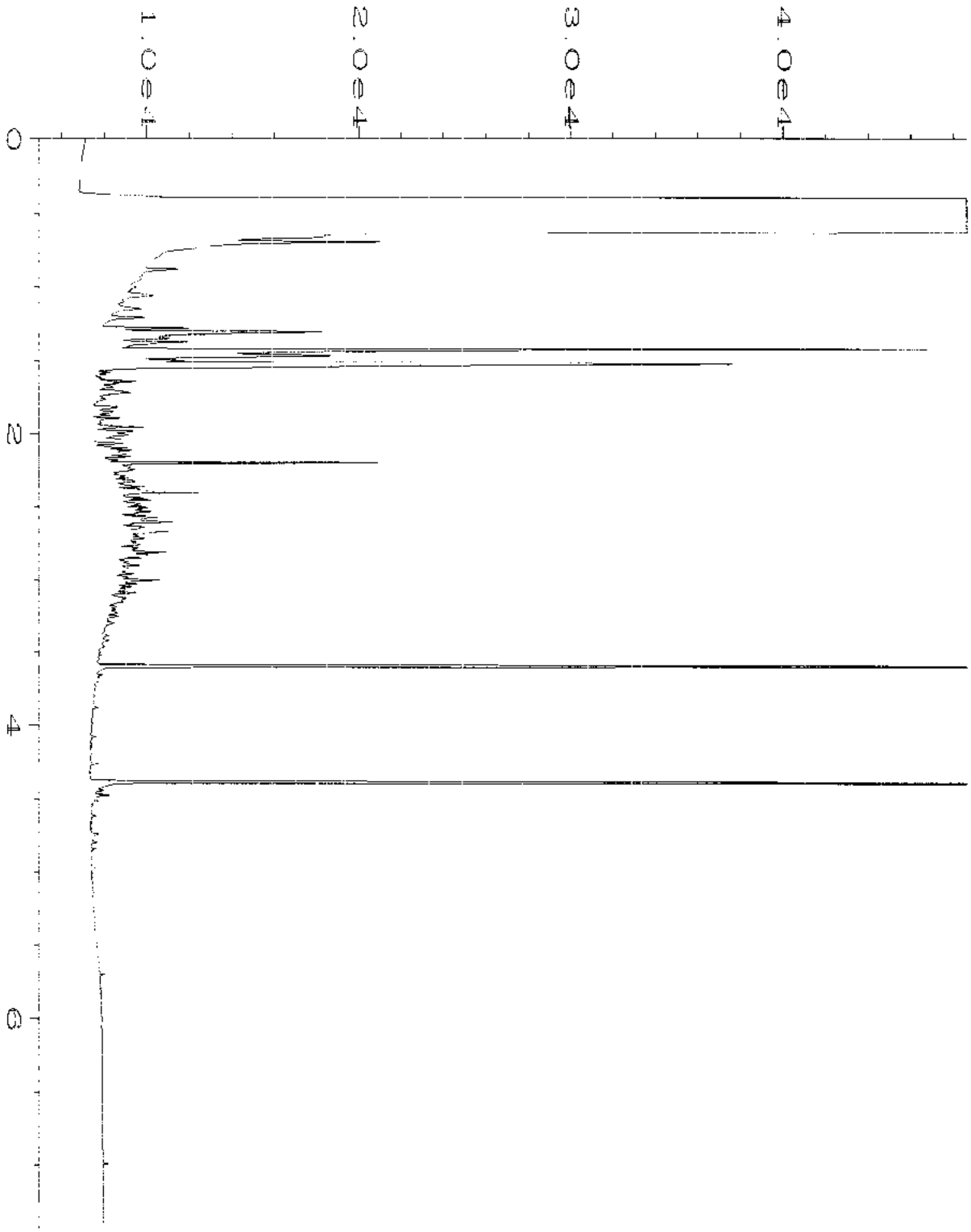
vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.



Data File Name : C:\HPCHEM\1\DATA\08-30-19\084F0401.D
Operator : TL
Instrument : GC1
Sample Name : 908594-01 sg
Run Time Bar Code:
Acquired on : 30 Aug 19 11:50 AM
Report Created on: 04 Sep 19 12:43 PM

Page Number : 1
Vial Number : 84
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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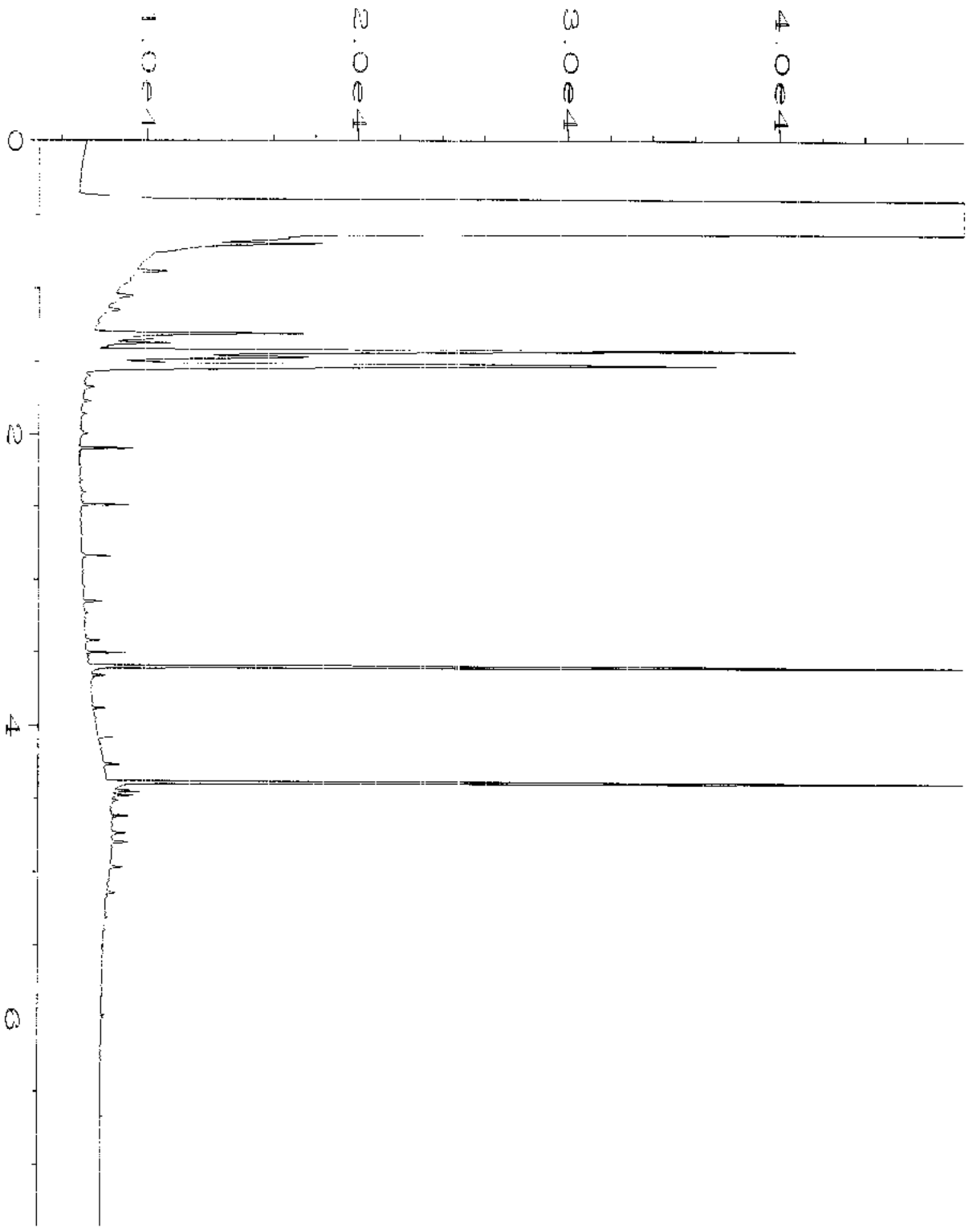
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 85
Sample Name	: 908594-02 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 4
Acquired on	: 30 Aug 19 12:02 PM	Instrument Method	: DX.MTH
Report Created on	: 04 Sep 19 12:43 PM	Analysis Method	: DX.MTH



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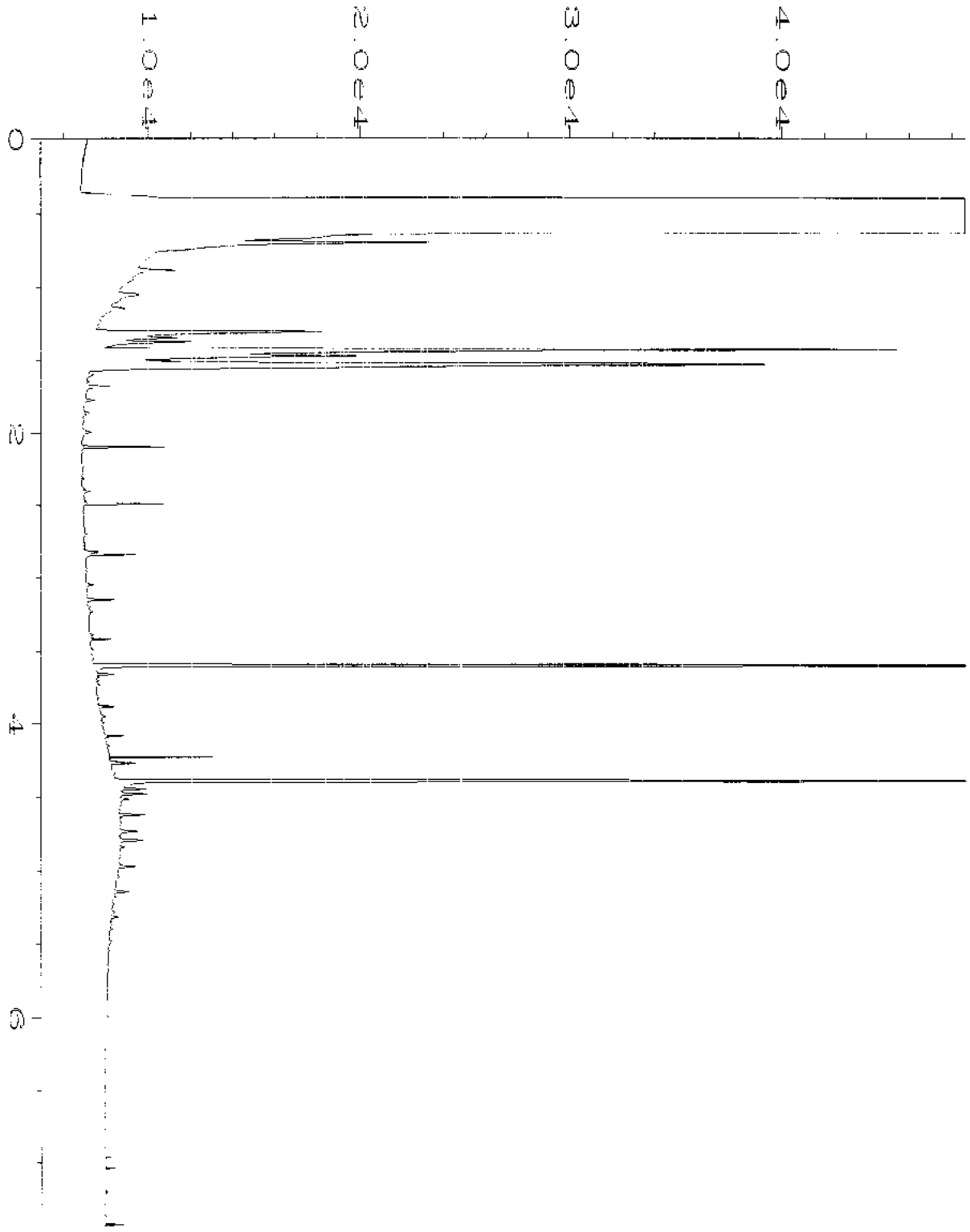
Operator : TL
Instrument : GC1
Sample Name : 908594-03 sg
Run Time Bar Code:
Acquired on : 30 Aug 19 12:13 PM
Report Created on: 04 Sep 19 12:43 PM

Page Number : 1
Vial Number : 86
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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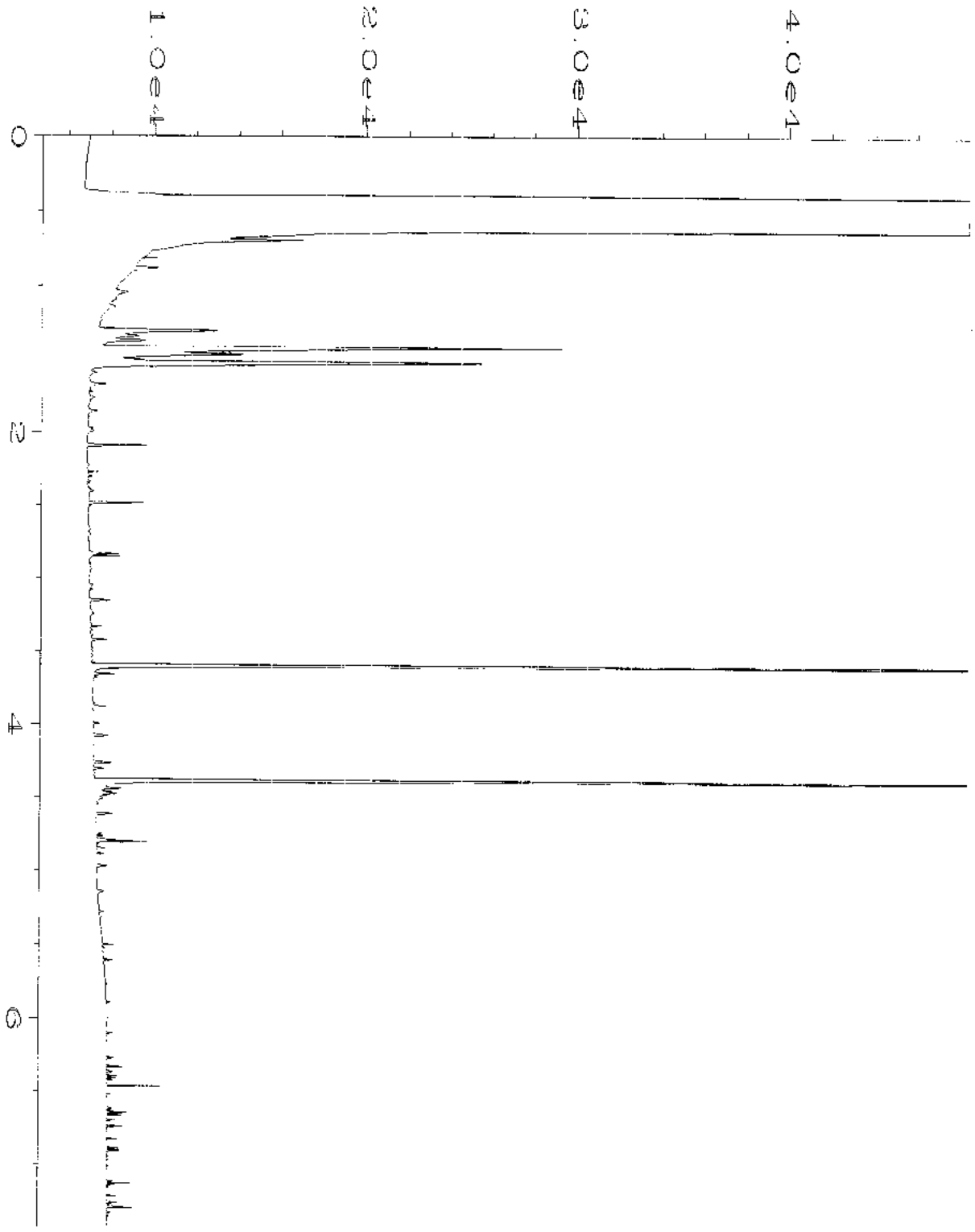
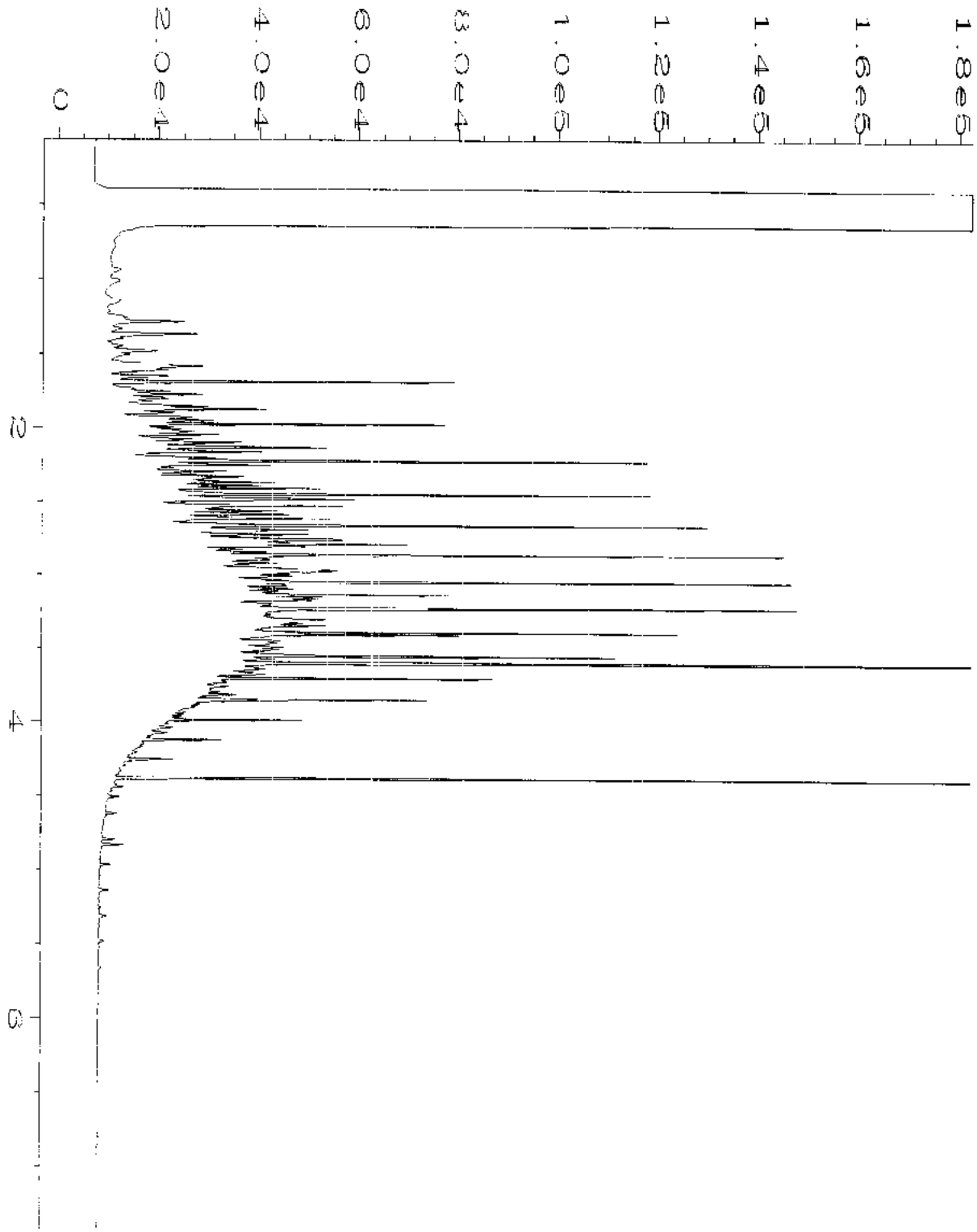
Operator : TL
Instrument : GC1
Sample Name : 908594-04 sg
Run Time Bar Code:
Acquired on : 30 Aug 19 12:25 PM
Report Created on: 04 Sep 19 12:43 PM

Page Number : 1
Vial Number : 87
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\1\DATA\08-30-19\081F0401.D
Operator : TL
Instrument : GC1
Sample Name : 09-2149 mb sg
Run Time Bar Code:
Acquired on : 30 Aug 19 11:18 AM
Report Created on: 04 Sep 19 12:42 PM

Page Number : 1
Vial Number : 81
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\1\DATA\08-30-19\003F0201.D
Operator : TL
Instrument : GC1
Sample Name : 500 Dx 57-78E
Run Time Bar Code:
Acquired on : 30 Aug 19 05:51 AM
Report Created on: 04 Sep 19 12:42 PM

Page Number : 1
Vial Number : 3
Injection Number : 1
Sequence Line : 2
Instrument Method: DX.MTH
Analysis Method : DX.MTH

908594

SAMPLE CHAIN OF CUSTODY ME 08-29-19

D04

Page # 1 of 1

Report To Lynn Grochala
Company Floyd Snider
Address 601 Union St, Ste 600
City, State, ZIP Seattle, WA 98101
Phone 206-292-2078 Email lynn.grochala@floydsnider.com

SAMPLERS (signature)

PROJECT NAME	PO #
Cantera - TOC	
REMARKS	INVOICE TO

TURNAROUND TIME
☐ Standard Turnaround
☒ RUSH 24-hour
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Archive Samples
☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM					Notes
01MW110-082919	01	8/29/19	1050	W	1		X										silica gel cleanup
01MW105-082919	02		1100		1		X										" "
01MW111-082919	03		1218		1		X										" "
01MW1110-082919	04		1223		1		X										" "

Samples received at 3 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kristin Andersen	Floyd Snider	8/29/19	1246
Received by:	DS VO	FCBI	8-29-19	12:46
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

Time Oil Bulk Terminal PPA

Supplemental Upland Remedial Investigation and Feasibility Study

Appendix D
PCUL Exceedances in Groundwater and Soil

Table D.1

Detected Exceedances in Groundwater—Metals[1]

Chemical of Interest		Arsenic	Chromium	Lead
Fraction		Total	Total	Total
CAS No.		7440-38-2	7440-47-3	7439-92-1
Units		µg/L	µg/L	µg/L
PCUL [2,3]		5 [3]	1	0.5
Location	**Sample Date**			
Bulk Terminal Property				
01MW100	4/17/2015		1.4	
ASKO Property				
MW03	5/3/2019	66		
East Waterfront Property				
02MW07	5/3/2019		2.1	6
02MW18	5/6/2019		1.4	
02MW19	5/6/2019	23	2.4	3.1
02MW20	5/6/2019	6.7		

Notes:

Empty cells indicate the sample had no detected exceedances for an analyte.

1 Only analytes with detected exceedances are included in this table. Refer to SES Remedial Investigation reports (SES 2014a, 2014b, and 2014c) for all analytical results.

2 Criteria are for the total fraction for arsenic and the dissolved fraction for chromium and lead. Therefore, data for chromium and lead presented here are for informational purposes only and not identified as exceedances in Table 6.1.

3 Arsenic is a proposed IHS in groundwater, and the PCUL is equivalent to the proposed CUL.

Abbreviations:

CAS Chemical Abstracts Service
µg/L Micrograms per liter
PCUL Preliminary cleanup level
SES SoundEarth Strategies, Inc.

Table D.2

Detected Exceedances in Groundwater—Total Petroleum Hydrocarbons and Benzene[1]

Chemical of Interest		Gasoline-Range Organics	Diesel- and Oil-Range Organics	Benzene
CAS No.		GRO	DRO+ORO	71-43-2
Units		µg/L	µg/L	µg/L
PCUL [2]		800	500	0.44
Location	**Sample Date**			
Bulk Terminal Property				
01MW02	5/1/2019	900	740	220
01MW03	5/1/2019	2,000		570
01MW06	4/30/19			0.53
01MW09	5/19/2016	890	690	110
01MW105	5/6/2019		11,000	
01MW111	7/25/19			1,900
01MW12	4/30/2019		590	3
01MW13	5/1/2019		2,200	
01MW18	5/16/2016	4,700	2,500	73
01MW19	4/30/2019	10,000	1,900	2,600
01MW20	5/16/2016		600	2.2
01MW24	4/30/2019	6,100	9,400	1,200
01MW27	4/30/2019			2.6
01MW35	5/1/2019		550	
01MW37	4/30/2019		600	
01MW38	4/30/2019		930	0.62
01MW39	4/30/2019		1,400	
01MW40	4/30/2019		1,100	
01MW42	4/30/2019		1,400	
01MW47	5/1/2019			800
01MW47	5/26/2016	2,900	2,800	
01MW48	5/1/2019		660	
01MW49	5/1/2019		850	
01MW51	5/26/2016		1,800	
01MW69	4/30/2019			0.74
01MW69	5/17/2016	1,100	800	
01MW75	5/1/2019		740	
01MW84	5/1/2019	8,400	2,800	
01MW86	5/1/2019	6,500	4,100	1,200
01MW90	5/11/2016		5,900	
01MW99	5/1/2019		570	
ASKO Property				
01MW07	5/2/2019		820	
01MW44	5/2/2019			13
01MW45	5/2/2019		850	1.6
01MW46	5/2/2019			14
01MW55	5/2/2019	940	920	1.3
01MW56	5/2/2019		1,000	
01MW63	5/2/2019	2,100	1,200	4.3
01MW70	5/2/2019		2,000	
01MW71	5/18/2016	930 [3]	4,000	
01MW79	5/2/2019		1,800	
01MW80	5/2/2019			16
01MW92	5/14/2019	1,500	5,900	
01MW96	5/14/2019		2,600	1.3
01MW98	5/14/2019		4,900	
MW03	5/3/2019			2.1
MW03	5/16/2016		6,200	
MW04	5/3/2019			1.1
MW05	5/3/2019			1
MW06	5/3/2019			2.6
ASKO Property & Bulk Terminal Property				
01MW59	4/30/2019		860	
East Waterfront Property				
02MW04	5/3/2019			3.7
02MW04	5/18/2016	3,000	1,800	
02MW07	5/3/2019		670	

Notes:

Empty cells indicate the sample had no detected exceedances for an analyte.

1 Only analytes with detected exceedances are included in this table. Refer to SES Remedial Investigation reports (SES 2014a, 2014b, and 2014c) for all analytical results.

2 Gasoline-range organics, diesel- and oil-range organics, and benzene are proposed IHSs in groundwater, and the PCULs are equivalent to the proposed cleanup levels.

3 The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Abbreviations:

CAS Chemical Abstracts Service
µg/L Micrograms per liter
PCUL Preliminary cleanup level
SES SoundEarth Strategies, Inc.

Table D.3
Detected Exceedances in Groundwater—cVOCs and SVOCs [1]

Chemical of Interest		1,1-Dichloroethene	cis-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl chloride	Pentachlorophenol
CAS No.		75-35-4	156-59-2	127-18-4	79-01-6	75-01-4	87-86-5
Units		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
PCUL [2]		7	16	2.4	0.5	0.2	0.2
Location	Sample Date						
Bulk Terminal Property							
01MW01	4/30/2019						2.1
01MW66	4/30/2019						3.6
ASKO Property							
01MW07	5/2/19				3.3	1.3	
01MW15	5/2/2019					7.2	
01MW44	5/2/2019		87		800	12	
01MW45	5/2/2019		200		330	12	
01MW46	5/2/2019		220		880	11	
01MW53	5/2/2019					0.26	
01MW55	5/2/2019			3.1	2,200	1.9	
01MW56	5/2/2019					0.61	
01MW58	5/2/2019				42	0.3	
01MW60	5/2/2019				15		
01MW62	5/2/2019				850		
01MW63	5/2/2019				5,900	39	
01MW70	5/2/2019		52		310	0.69	
01MW71	5/2/2019	13	120		2,800	7.9	
01MW78	5/2/2019				1.2		
01MW79	5/2/2019		28		61	3.8	
01MW80	5/2/2019		250		710	10	
01MW85	5/3/2019					7.9	
01MW92	5/14/2019		570		5,200		
01MW96	5/14/2019				1.5	6	
01MW97	5/14/2019		20		56		
01MW98	5/14/2019		57		810		
01MW108	5/3/2019					0.33	
MW03	5/3/2019					0.72	
MW04	5/3/2019		20		970	2.5	
MW05	5/3/2019		120		240	27	
MW06	5/3/2019		31		330	2.8	

Notes:

Empty cells indicate the sample had no detected exceedances for an analyte.

1 Only analytes with detected exceedances are included in this table. Refer to SES Remedial Investigation reports (SES 2014a, 2014b, and 2014c) for all analytical results.

2 Trichloroethene, vinyl chloride, and pentachlorophenol are proposed IHSs in groundwater, and the PCULs are equivalent to the proposed cleanup levels.

Abbreviations:

CAS Chemical Abstracts Service
cVOC Chlorinated volatile organic compound
µg/L Micrograms per liter
PCUL Preliminary cleanup level
SES SoundEarth Strategies, Inc.
SVOC Semivolatile organic compound

Table D.4

Detected Exceedances in Soil—Metals [1]

			Chemical of Interest	Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver
			CAS No.	7440-38-2	7440-39-3	7440-43-9	7440-47-3	7439-92-1	7782-49-2	7440-22-4
			Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
			PCUL [2]	7.3	100	14	67	120	0.5	2
Location	**Sample ID**	**Sample Depth**	**Sample Date**							
Bulk Terminal Property										
D-S	D-S-1.5	1.5 feet	04/22/2006					140		
GP08	GP08-2.5	2.5 feet	08/31/2006		120					
GP01	GP01-8	8 feet	08/31/2006		110					
GP02	GP02-8	8 feet	08/31/2006		110					
GP04	GP04-8	8 feet	08/31/2006	14	140					
GP09	GP09-8	8 feet	09/01/2006		120					
GP12	GP12-12	12 feet	09/01/2006		140		76			
01MW26	01MW26-15	15 feet	12/04/2002					280		
ASKO Property										
MW04	B04-1	1 feet	04/18/2006							3.3
MW05	B05-1.5	1.5 feet	04/19/2006	8.1	220					
MW02	B02-4.5	4.5 feet	04/17/2006		110					
SB-49	SB-49-5	5 feet	11/29/2000	8						
MW03	B03-6	6 feet	04/18/2006	9.8	120					
SB-40	SB-40-10	10 feet	11/21/2000						0.59	
SB-50	SB-50-10	10 feet	11/29/2000				87		1.4	
SB-40	SB-40-15	15 feet	11/21/2000				77		0.71	
East Waterfront Property										
SS-02	SS-02-0-0.5	0–0.5 feet	04/26/2019	30		46				2.4
SS-03	SS-03-0.25-0.75	0.25–0.75 feet	04/26/2019	26						

Notes:

Empty cells indicate the sample had no detected exceedances for an analyte.

1 Only analytes with detected exceedances are included in this table. Refer to SES Remedial Investigation Reports (SES 2014a, 2014b, and 2014c) for all analytical results.

2 Arsenic is a proposed IHS in soil, and the PCUL is equivalent to the proposed cleanup level.

Abbreviations:

CAS Chemical Abstracts Service
mg/kg Milligrams per kilogram
PCUL Preliminary cleanup level
SES SoundEarth Strategies, Inc.

Table D.5

Detected Exceedances in Soil—Total Petroleum Hydrocarbons and Benzene [1]

			Chemical of Interest	Gasoline-Range Organics	Diesel-Range Organics	Diesel- and Oil-Range Organics	Benzene
			CAS No.	GRO	DRO	DRO+ORO	71-43-2
			Units	mg/kg	mg/kg	mg/kg	mg/kg
			PCUL [2]	30	6,000	2,000	0.02
Location	**Sample ID**	**Sample Depth**	**Sample Date**				
Bulk Terminal Property							
01MW72	B167-0.5	0.5 feet	03/10/2010				0.05
01MW73	B168-0.5	0.5 feet	03/10/2010			2,700	
01MW67	B118-01	1 feet	07/23/2009	450	8,700	12,000	
B330	B330-45	1 feet	05/21/2014	51		14,000	
M2-NE-EX03-SSW01	M2-NE-EX03-SSW01-45	1 feet	09/21/2012				0.046
D-N	D-N-1.5	1.5 feet	04/22/2006	150			
01MW06	SB-29-2	2 feet	11/01/2000	540		4,400	
01MW12	SB-24-2	2 feet	01/01/2001	58		2,600	
GP06	GP06-2	2 feet	08/31/2006	760 [4]	9,000	12,000	
01MW38	SB-59-2.5'	2.5 feet	09/07/2006	940			0.19
01MW59	B082-02.5	2.5 feet	11/17/2008	160			
01SB09	01SB09-2.5	2.5 feet	06/06/1999	380		2,300	2.1
B126	B126-02.5	2.5 feet	12/28/2009				0.1
B127	B127-02.5	2.5 feet	12/28/2009	47	6,600	6,600	
B129	B129-02.5	2.5 feet	12/29/2009	230		3,000	
B181	B181-02.5	2.5 feet	03/25/2011	2,800			40
GP08	GP08-2.5	2.5 feet	08/31/2006	760 [4]			0.5
B338	B338-43	3 feet	05/22/2014	2,400		2,400	25
B347	B347-43	3 feet	05/23/2014	110	6,100	6,100	0.031
B351	B351-43	3 feet	05/27/2014	390			
GP10	GP10-4	4 feet	09/01/2006	50			0.068
SB-13	SB-13-2	2 feet	01/01/2001	9,300	11,000	12,000	14
SB-15	SB-15-2	2 feet	01/01/2001	900		3,200	
SB-19	SB-19-2	2 feet	01/01/2001	1,500		4,100	
SB-31	SB-31-2	2 feet	11/01/2000	580	11,000	19,000	
SB-39	SB-39-2	2 feet	01/01/2001	35		2,900	
SB-59	SB-59-2	2 feet	07/19/2001	66			
PI1	1991-UST-Excavation-PI1	4 feet	09/16/1991	12,000			330
PI2	1991-UST-Excavation-PI2	4 feet	09/16/1991	1,300			27
B127	B127-04.5	4.5 feet	12/28/2009	780		2,100	
B180	B180-04.5	4.5 feet	03/25/2011	1,300			0.5
01MW06	SB-29-5	5 feet	11/01/2000	390		2,400	
01MW08	SB-35-5	5 feet	01/01/2001	190			
01MW24	01MW24-5	5 feet	12/03/2002	2,200		3,100	4.4
01MW27	01MW27-5	5 feet	12/04/2002	5,500	7,400	7,400	180
01MW28	01MW28-5	5 feet	12/05/2002	47			
01MW29	01MW29-5	5 feet	12/03/2002	130			
01MW59	B082-05	5 feet	11/17/2008	200	7,100	8,500	
01SB07	SB-07-05	5 feet	06/06/1999	1,200			2.2
B129	B129-05	5 feet	12/29/2009	35			
B337	B337-41	5 feet	05/22/2014	5,600			66
B338	B338-41	5 feet	05/22/2014	8,200		2,900	86
B340	B340-41	5 feet	05/22/2014	71			0.2
B346	B346-41	5 feet	05/23/2014	3,200		6,000	1.3
B348	B348-41	5 feet	05/27/2014	1,200	13,000	13,000	12
B352	B352-41	5 feet	05/28/2014	710	7,600	7,600	
LR01	LR01-5	5 feet	12/03/2002	250	7,400	7,400	0.39
LR03	LR03-5	5 feet	12/04/2002	60			
LR04	LR04-5	5 feet	12/04/2002		8,000	8,000	
LR05	LR05-5	5 feet	12/04/2002	660		3,000	0.54
LR06	LR06-5	5 feet	12/01/2002	38			
LR07	LR07-5	5 feet	12/01/2002	1,500		4,200	1.1
SB-19	SB-19-5	5 feet	01/01/2001	960			
SB-22	SB-22-5	5 feet	01/01/2001	270			
SB-27	SB-27-5	5 feet	11/01/2000	120			
SB-39	SB-39-5	5 feet	01/01/2001	610			
SB-59	SB-59-5	5 feet	07/19/2001	800		6,100	
UST05-ESW01	UST05-ESW01-05	5 feet	02/05/2014	40			
UST05-NSW01	UST05-NSW01-05	5 feet	02/05/2014	270		4,200	
UST05-SSW01	UST05-SSW01-05	5 feet	02/05/2014	710		4,100	
UST05-WSW01	UST05-WSW01-05	5 feet	02/05/2014	1,200	12,000	13,000	
01MW74	B169-05.5	5.5 feet	03/10/2010	2,600		2,300	12
01SB09	01SB09-7	7 feet	06/06/1999	2,400	25,000	25,000	3.5
B336	B336-39	7 feet	05/22/2014	440	32,000	35,000	0.37
B337	B337-39	7 feet	05/22/2014				0.87
B338	B338-39	7 feet	05/22/2014	2,200			16
B345	B345-39	7 feet	05/23/2014	1,500		4,900	8.1
B347	B347-39	7 feet	05/23/2014	920	6,500	6,500	1.4
GP10	GP10-7	7 feet	09/01/2006	9,300	16,000	16,000	15
UST05-BTM01	UST05-BTM01-07	7 feet	02/05/2014	630		2,100	
01MW38	SB-59-7.5'	7.5 feet	09/07/2006	79			
01MW30	B01-8	8 feet	04/21/2006	84 [3]			
EX01F01	EX-F01-08	8 feet	05/01/2012	170		3,900	
HQ-E	HQ-E-8	8 feet	04/22/2006	78			
01MW33	01MW33-8.5	8.5 feet	07/07/2006	640 [4]	7,100	7,700	
B339	B339-37	9 feet	05/22/2014	3,600	8,900	8,900	11
B340	B340-37	9 feet	05/22/2014	2,100	8,400	8,400	2.9
B341	B341-37	9 feet	05/22/2014	2,800		2,900	6.7
B346	B346-37	9 feet	05/23/2014	5,400	22,000	22,000	18
B127	B127-09.5	9.5 feet	12/28/2009			2,400	

Table D.5

Detected Exceedances in Soil—Total Petroleum Hydrocarbons and Benzene [1]

			Chemical of Interest	Gasoline-Range Organics	Diesel-Range Organics	Diesel- and Oil-Range Organics	Benzene
			CAS No.	GRO	DRO	DRO+ORO	71-43-2
			Units	mg/kg	mg/kg	mg/kg	mg/kg
			PCUL [2]	30	6,000	2,000	0.02
Location	**Sample ID**	**Sample Depth**	**Sample Date**				
Bulk Terminal Property (cont.)							
01MW73	B168-10	10 feet	03/10/2010				0.12
01SB05	01SB05-10	10 feet	06/06/1999	2,400		2,500	
E1	1991-UST-Excavation-E1	10 feet	09/16/1991	180			
GP14	GP14-10	10 feet	09/01/2006				0.074
01MW10	SB-37-10	10 feet	01/01/2001	1,100		5,800	
01MW12	SB-24-10	10 feet	01/01/2001	250			
01MW27	01MW27-10	10 feet	12/04/2002	2,400	11,000	12,000	8.2
01MW28	01MW28-10	10 feet	12/05/2002	1,200	19,000	19,000	
01MW29	01MW29-10	10 feet	12/03/2002	120			
LR01	LR01-10	10 feet	12/03/2002	180		2,700	
LR02	LR02-10	10 feet	12/04/2002	1,100	12,000	12,000	0.83
LR03	LR03-10	10 feet	12/04/2002	1,500	19,000	19,000	1.5
LR04	LR04-10	10 feet	12/04/2002	830	7,100	7,100	0.32
LR05	LR05-10	10 feet	12/04/2002	1,300	15,000	15,000	2.2
LR07	LR07-10	10 feet	12/01/2002	530		5,800	
SB-22	SB-22-10	10 feet	01/01/2001	290	6,500	6,500	
VK-N	VK-N-10	10 feet	04/22/2006	810		2,600	
VK-W	VK-W-10	10 feet	04/22/2006	180			
01MW68	B119-10.5	10.5 feet	07/23/2009	1,100	6,400	6,400	29
01MW74	B169-10.5	10.5 feet	03/10/2010	200		2,700	3.9
01MW33	01MW33-11	11 feet	07/07/2006	370 [4]			
B338	B338-34	12 feet	05/22/2014	2,500		4,400	18
B339	B339-34	12 feet	05/22/2014	6,800	9,800	9,800	41
B342	B342-34	12 feet	05/23/2014	7,700	11,000	11,000	66
B348	B348-34	12 feet	05/27/2014	14,000	6,100	6,100	70
B352	B352-34	12 feet	05/28/2014	7,900		5,000	86
HQ-B	HQ-B-12	12 feet	04/22/2006				0.03
01SB08	01SB08-12.5	12.5 feet	06/06/1999	3,700	34,000	34,000	10
01SB09	01SB09-12.5	12.5 feet	06/06/1999	760,000	15,000	15,000	5,600
Floor	1991-UST-Excavation-Floor	12.5 feet	09/16/1991	120			1.1
01MW49	B70-13	13 feet	12/21/2006	280	6,800	6,800	
B343	B343-32	14 feet	05/23/2014	4,600		2,400	28
B353	B353-32	14 feet	05/28/2014	6,000	10,000	10,000	17
B354	B354-32	14 feet	05/28/2014		7,500	7,500	0.33
01MW08	SB-35-15	15 feet	01/01/2001	1,600	9,400	11,000	
01MW09	SB-36-15	15 feet	01/01/2001	4,300	11,000	11,000	
01MW10	SB-37-15	15 feet	01/01/2001		9,100	9,100	
01MW16	SB-60-15	15 feet	07/19/2001	1,200	11,000	11,000	1.7
01MW18	SB-65-15	15 feet	03/11/2002	280			
01MW19	SB-66-15	15 feet	03/11/2002				0.29
01MW47	B68-15	15 feet	11/29/2006		11,000	11,000	
GP10	GP10- 15	15 feet	09/01/2006				0.45
01MW22	01MW22-15	15 feet	12/02/2002				0.22
01MW24	01MW24-15	15 feet	12/03/2002				0.1
01MW26	01MW26-15	15 feet	12/04/2002	1,400	7,000	7,000	
01MW27	01MW27-15	15 feet	12/04/2002	180		3,800	0.27
01MW28	01MW28-15	15 feet	12/05/2002	2,900		2,800	9.8
01MW29	01MW29-15	15 feet	12/03/2002	300			0.11
LR01	LR01-15	15 feet	12/03/2002	1,400	14,000	14,000	0.89
LR02	LR02-15	15 feet	12/04/2002	1,300	20,000	20,000	1.1
LR03	LR03-15	15 feet	12/04/2002	1,900	18,000	18,000	6.7
LR04	LR04-15	15 feet	12/04/2002	2,900	28,000	28,000	4.9
LR05	LR05-15	15 feet	12/04/2002	940		5,800	
LR07	LR07-15	15 feet	12/01/2002	1,400	11,000	11,000	2.5
01MW35	01MW35-16	16 feet	07/07/2006	330 [3]			
B342	B342-30	16 feet	05/23/2014	38			1.4
B343	B343-28.5	17.5 feet	05/23/2014	4,800			41
01SB09	01SB09-18	18 feet	06/06/1999	4,000		5,900	5.3
01MW33	01MW33-18	18 feet	07/07/2006				0.05
01MW16	SB-60-20	20 feet	07/19/2001				0.05
01MW18	SB-65-20	20 feet	03/11/2002	220			0.32
01MW22	01MW22-20	20 feet	12/02/2002				0.21
01MW24	01MW24-20	20 feet	12/03/2002				0.045
01MW29	01MW29-20	20 feet	12/03/2002				0.29
01MW31	01MW31-20	20 feet	07/06/2006				0.05
01MW47	B68-20	20 feet	11/29/2006	150	10,000	10,000	1.4
LR01	LR01-20	20 feet	12/03/2002				1.4
LR02	LR02-20	20 feet	12/04/2002	52			0.087
01MW68	B119-21	21 feet	07/23/2009				0.07
01MW48	B69-23	23 feet	11/30/2006				0.55
01MW48	B69-28	28 feet	11/30/2006				0.28

Table D.5

Detected Exceedances in Soil—Total Petroleum Hydrocarbons and Benzene [1]

			Chemical of Interest	Gasoline-Range Organics	Diesel-Range Organics	Diesel- and Oil-Range Organics	Benzene
			CAS No.	GRO	DRO	DRO+ORO	71-43-2
			Units	mg/kg	mg/kg	mg/kg	mg/kg
			PCUL [2]	30	6,000	2,000	0.02
Location	**Sample ID**	**Sample Depth**	**Sample Date**				
ASKO Property							
B99	B99-0.5	0–0.5 feet	12/30/2008	54		2,200	0.21
MW04	B04-1	1 feet	04/18/2006	310 [3]			
B07	B07-1.5	1.5 feet	04/21/2006	140 [3]			
MW05	B05-1.5	1.5 feet	04/19/2006	57 [3]			
B91	B91-02	2 feet	12/29/2008	800	8,300	8,300	
MW06	B06-2	2 feet	04/19/2006	140 [4]		2,300	
MW06	B99-2	2 feet	04/19/2006	81 [4]		4,700	
SB-30	SB-30-2	2 feet	01/01/2001	5,100			
SB-45	SB-45-2	2 feet	01/01/2001	3,900		5,300	
SB-49	SB-49-2	2 feet	11/29/2000	260		7,100	
01MW46	SB 67-2.5	2.5 feet	09/13/2006	96			
01MW64	B102-02.5	2.5 feet	03/17/2009	68			
01MW79	B174-02.5	2.5 feet	03/03/2011				0.027
01MW80	B188-02.5	2.5 feet	04/18/2011	95		2,300	
B176	B176-02.5	2.5 feet	03/25/2011	200		2,800	
B07	B07-3	3 feet	04/21/2006	57 [4]			
B100	B100-03	3 feet	12/30/2008	96			
B116	B116-03	3 feet	03/18/2009			4,100	
B90	B90-03	3 feet	12/29/2008	380	10,000	24,000	0.081
01MW60	B083-05	5 feet	12/29/2008	240		2,900	
01MW95	B261-05	5 feet	08/17/2012	240		3,000	
SB-32	SB-32-5	5 feet	01/01/2001	220			
SB-45	SB-45-5	5 feet	01/01/2001	580		2,200	
SB-49	SB-49-5	5 feet	11/29/2000	470			
01MW98	B266-06	6 feet	05/07/2013	130		5,200	
B97	B97-06	6 feet	12/30/2008	1,600		3,200	
MW03	B03-6	6 feet	04/18/2006	4,700 [4]		2,200	
B94	B94-07	7 feet	12/30/2008	52			
01MW60	B083-07.5	7.5 feet	12/29/2008	1,600		3,200	0.61
01MW80	B188-07.5	7.5 feet	04/18/2011	260		2,300	
01SVE01	B135-10.5	10.5 feet	02/11/2010				0.04
B89	B89-11	11 feet	12/29/2008	420			
B89	B89-13	13 feet	12/29/2008	9,700		6,000	0.25
B95	B95-14	14 feet	12/30/2008				0.041
East Waterfront Property							
B296	B296-0.5	0.5 feet	10/22/2013	190		15,000	
B297	B297-01	1 feet	10/22/2013	49		2,100	
B303	B303-01	1 feet	10/23/2013	200		4,100	
B305	B305-01	1 feet	10/23/2013	46			
02MW20	02MW20-1.5-2	1.5–2 feet	04/25/2019	440		3,400	
02MW22	02MW22-1.5-2	1.5–2 feet	04/25/2019	340			
B314	B314-12.5	12.5 feet	11/06/2013	420		6,300	
B267	B267-02.5	2.5 feet	10/01/2013				0.039
B270	B270-02.5	2.5 feet	10/01/2013	43			
B271	B271-02.5	2.5 feet	10/01/2013	320		4,400	
B308	B308-02.5	2.5 feet	10/23/2013	240		14,000	
02MW05	02MW05-25	25 feet	09/13/1999				0.22
D02-EX01-NSW01	D02-EX01-NSW01-03	3 feet	10/28/2013			2,100	
B300	B300-03.5	3.5 feet	10/22/2013	280		23,000	0.21
B306	B306-04	4 feet	10/23/2013	65		2,400	
TP03	TP03-06	6 feet	10/15/2013	42			
B300	B300-06.5	6.5 feet	10/22/2013				0.076
B277	B277-08	8 feet	10/16/2013	280		16,000	0.19
B314	B314-15	15 feet	11/06/2013				0.084

Notes:

Empty cells indicate the sample had no detected exceedances for an analyte.

1 Only analytes with detected exceedances are included in this table. Refer to SES Remedial Investigation Reports (SES 2014a, 2014b, and 2014c) for all analytical results.

2 Gasoline-range organics, diesel- and oil-range organics, and benzene are proposed IHSs in soil, and the PCULs are equivalent to the proposed cleanup levels.

3 Results reported for the gas range are primarily due to overlap from diesel-range hydrocarbons.

4 The chromatogram for this sample does not resemble a typical gasoline pattern.

Abbreviations:

CAS Chemical Abstracts Service
mg/kg Milligrams per kilogram
PCUL Preliminary cleanup level
SES SoundEarth Strategies, Inc.

Table D.6

Detected Exceedances in Soil—Chlorinated Volatile Organic Compounds [1]

Chemical of Interest				1,2-Dichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl chloride
CAS No.				107-06-2	156-59-2	156-60-5	127-18-4	79-01-6	75-01-4
Units				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
PCUL[2]				0.02	0.02	0.063	0.025	0.02	0.025
Location	Sample ID	Sample Depth	Sample Date						
Bulk Terminal Property									
01MW41	SB-62-12.5	12.5 feet	09/08/2006	0.058					
ASKO Property									
B94	B94-2	2 feet	12/30/2008		0.22				
B96	B96-02	2 feet	12/30/2008					0.043	
01MW44	SB 65-2.5	2.5 feet	09/13/2006					0.039	
01MW64	B102-02.5	2.5 feet	03/17/2009		0.18		0.07	44	
01MW70	B134-02.5	2.5 feet	02/11/2010					0.033	
01MW97	B265-03	3 feet	05/07/2013					0.098	
B90	B90-03	3 feet	12/29/2008		0.85		0.17	4.4	
B111	B111-03	3 feet	03/17/2009		0.037			0.032	
B116	B116-03	3 feet	03/18/2009					0.21	
B110	B110-04	4 feet	03/17/2009		0.18				
01IW09	B136-05	5 feet	02/12/2010		0.063			0.17	
01MW54	B076-05	5 feet	11/13/2008					0.11	
01MW62	B085-05	5 feet	12/30/2008					0.22	
01MW76	B171-05	5 feet	02/28/2011					0.065	
B87	B87-05	5 feet	12/29/2008		0.071				
01MW71	B133-05.5	5.5 feet	02/11/2010		0.068			0.8	
01MW97	B265-06	6 feet	05/07/2013					0.12	
01MW98	B266-06	6 feet	05/07/2013					0.55	
B92	B92-06	6 feet	12/30/2008		0.13			2.4	
B95	B95-06	6 feet	12/30/2008					0.42	
B97	B97-06	6 feet	12/30/2008					0.031	
B109	B109-06	6 feet	03/17/2009					0.24	
B107	B107-07	7 feet	03/17/2009					0.19	
B112	B112-07	7 feet	03/18/2009					0.23	
01MW64	B102-07.5	7.5 feet	03/17/2009		0.12			15	
01MW78	B173-07.5	7.5 feet	03/02/2011		0.065			7.7	
01MW93	B259-07.5	7.5 feet	08/16/2012					0.18	
01MW98	B266-08	8 feet	05/07/2013					0.12	
B99	B99-09	9 feet	12/30/2008		0.7			0.077	
01MW54	B076-10	10 feet	11/13/2008		1.7		0.24	34	
01MW76	B171-10	10 feet	02/28/2011					0.6	
01MW92	B258-10	10 feet	08/16/2012					0.05	
B101	B101-10	10 feet	12/30/2008					0.31	
B104	B104-10	10 feet	03/17/2009		0.061			2.5	
B105	B105-10	10 feet	03/17/2009					0.091	
B87	B87-10	10 feet	12/29/2008		0.43			3.4	
B88	B88-10	10 feet	12/29/2008					0.16	
B91	B91-10	10 feet	12/29/2008					0.098	
B92	B92-10	10 feet	12/30/2008		1			89	
B93	B93-10	10 feet	12/30/2008		0.1			1	
B95	B95-10	10 feet	12/30/2008		0.76			30	
B96	B96-10	10 feet	12/30/2008					0.53	
B98	B98-10	10 feet	12/30/2008					0.37	
B110	B110-10	10 feet	03/17/2009		0.21			4.2	
B131	B131-10	10 feet	12/29/2009					0.23	
SB-40	SB-40-10	10 feet	11/21/2000					0.17	
01MW70	B134-10.5	10.5 feet	02/11/2010			0.15		1.7	
01MW79	B174-10.5	10.5 feet	03/03/2011					0.13	
01SVE01	B135-10.5	10.5 feet	02/11/2010		0.47			16	
01IW10	B137-11	11 feet	02/12/2010		0.11			1.4	
01MW97	B265-11	11 feet	05/07/2013		0.071			7.9	
B175	B175-11	11 feet	03/03/2011		0.56			0.72	
01IW09	B136-11.5	11.5 feet	02/12/2010		0.091			0.86	
B113	B113-11.5	11.5 feet	03/18/2009		0.035				
B106	B106-12	12 feet	03/17/2009					0.067	
B109	B109-12	12 feet	03/17/2009		0.12			1.6	
B115	B115-12	12 feet	03/18/2009					0.037	
B107	B107-13	13 feet	03/17/2009		0.55			110	
B112	B112-13	13 feet	03/18/2009		0.098			1.1	
B101	B101-14	14 feet	12/30/2008					0.14	
B104	B104-14	14 feet	03/17/2009		0.16			3.8	
B91	B91-14	14 feet	12/29/2008					0.15	
B92	B92-14	14 feet	12/30/2008		0.084			2.6	
B94	B94-14	14 feet	12/30/2008		0.083			1.3	
B95	B95-14	14 feet	12/30/2008		0.87			45	
B108	B108-14	14 feet	03/17/2009					0.42	
B131	B131-14.5-15	14.5–15 feet	03/30/2010		0.075			0.5	
01MW54	B076-15	15 feet	11/13/2008		0.14			4.5	
01MW55	B077-15	15 feet	11/13/2008		0.1			7.8	
01MW76	B171-15	15 feet	02/28/2011					0.1	
01SVE01	B135-15	15 feet	02/11/2010		0.28			3.8	
B105	B105-15	15 feet	03/17/2009		0.27			9	
B109	B109-15	15 feet	03/17/2009		0.032			0.9	
B131	B131-15-15.5	15–15.5 feet	03/30/2010		0.14			0.66	
01IW09	B136-16	16 feet	02/12/2010		0.16			4.3	
B106	B106-16	16 feet	03/17/2009		0.078			5.2	
B87	B87-16	16 feet	12/29/2008		0.59			19	
B88	B88-16	16 feet	12/29/2008		0.05			0.82	
B90	B90-16	16 feet	12/29/2008		0.15				
B110	B110-16	16 feet	03/17/2009		0.026			0.8	
B112	B112-16	16 feet	03/18/2009		0.22			3.3	
B116	B116-16	16 feet	03/18/2009		0.2				
B107	B107-17	17 feet	03/17/2009		0.51			31	

Table D.6

Detected Exceedances in Soil—Chlorinated Volatile Organic Compounds [1]

Chemical of Interest				1,2-Dichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl chloride
CAS No.				107-06-2	156-59-2	156-60-5	127-18-4	79-01-6	75-01-4
Units				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
PCUL[2]				0.02	0.02	0.063	0.025	0.02	0.025
Location	Sample ID	Sample Depth	Sample Date						
ASKO Property (cont.)									
01MW64	B102-17.5	17.5 feet	03/17/2009					1.3	
01MW76	B171-17.5	17.5 feet	02/28/2011					0.19	
01MW62	B085-17.5	17.5-18 feet	12/30/2008		0.12			66	
B104	B104-18	18 feet	03/17/2009		0.11			3.1	
B93	B93-18	18 feet	12/30/2008		1.3		0.12	60	
B111	B111-18	18 feet	03/17/2009		0.35			20	0.039
B112	B112-18	18 feet	03/18/2009					0.35	
B114	B114-18	18 feet	03/18/2009		0.11			2.8	
B115	B115-18	18 feet	03/18/2009					0.43	
01MW62	B085-20	20 feet	12/30/2008		0.14			52	
01MW71	B133-20	20 feet	02/11/2010		0.34			120	
01MW77	B172-20	20 feet	03/01/2011		0.058			3.1	
B105	B105-20	20 feet	03/17/2009					0.22	
B106	B106-20	20 feet	03/17/2009		0.99			36	0.13
B93	B93-20	20 feet	12/30/2008		0.064			1.6	
B95	B95-20	20 feet	12/30/2008		0.072			2.1	
B96	B96-20	20 feet	12/30/2008					0.96	
B98	B98-20	20 feet	12/30/2008					0.16	
B114	B114-21	21 feet	03/18/2009		0.042			2.3	
B107	B107-22	22 feet	03/17/2009		0.17			6	
01MW45	SB 66-22.5	22.5 feet	09/13/2006		0.037			1.8	
MW05	B05-22.5	22.5 feet	04/19/2006		0.042			5.4	
01IW10	B137-23	23 feet	02/12/2010		0.081			2.6	
01MW78	B173-25	25 feet	03/02/2011					47	
01MW78	B173-27.5	27.5 feet	03/02/2011					5.3	
01MW62	B085-30	30 feet	12/30/2008					4.2	
01MW62	B085-37.5	37.5 feet	12/30/2008					0.1	
01MW65	B103-40	40 feet	03/17/2009					0.18	

Notes:

Empty cells indicate the sample had no detected exceedances for an analyte.

1 Only analytes with detected exceedances are included in this table. Refer to SES Remedial Investigation Reports (SES 2014a, 2014b, and 2014c) for all analytical results.

2 Trichloroethene is a proposed IHS in soil, and the PCUL is equivalent to the proposed cleanup level.

Abbreviations:

CAS Chemical Abstracts Service
mg/kg Milligrams per kilogram
PCUL Preliminary cleanup level
SES SoundEarth Strategies, Inc.

Table D.7

Detected Exceedances in Soil—Semivolatile Organic Compounds and Dioxins/Furans [1]

			Chemical of Interest	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Chrysene	Indeno(1,2,3-c,d)pyrene	cPAH TEQ	Pentachlorophenol	Chlorinated dibenzo-p-dioxins	Chlorinated dibenzofurans
			CAS No.	56-55-3	205-99-2	207-08-9	50-32-8	218-01-9	193-39-5	CPAHTEQ	87-86-5	DIOX	FUR
			Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ng/kg	ng/kg
			PCUL [2]	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	2	2
Location	Sample ID	Sample Depth	Sample Date										
Bulk Terminal Property													
01MW16	SB-60-2	2 feet	07/19/2001		0.021			0.021					
01MW17	SB-61-2	2 feet	07/19/2001		0.03		0.033		0.046	0.042			
SB-05	SB-05-2	2 feet	11/01/2000								0.076		
01MW24	01MW24-5	5 feet	12/03/2002	0.012				0.034					
LR03	LR03-5	5 feet	12/04/2002	0.012				0.035					
SB-01	SB-01-5	5 feet	11/01/2000								0.087		
SB-05	SB-05-5	5 feet	11/01/2000								0.26		
B338	B338-39	7 feet	05/22/2014									3.62 J	
B342	B342-39	7 feet	05/23/2014									7.8 J	
GP19	GP19-7	7 feet	09/05/2006								0.19		
B338	B338-37	9 feet	05/22/2014								0.083	18 J	
B339	B339-37	9 feet	05/22/2014								0.33	3.15 J	
B340	B340-37	9 feet	05/22/2014								0.12		
B341	B341-37	9 feet	05/22/2014								0.33		
B342	B342-37	9 feet	05/23/2014								0.28	23.5 J	3.37 J
B343	B343-37	9 feet	05/23/2014									3.76 J	
B354	B354-37	9 feet	05/28/2014									4.16 J	
SB-01	SB-01-10	10 feet	11/01/2000								0.081		
SB-02	SB-02-10	10 feet	11/01/2000								0.061		
SB-05	SB-05-10	10 feet	11/01/2000								0.098		
SB-52	SB-52-10	10 feet	07/16/2001								0.13		
SB-54	SB-54-10	10 feet	07/16/2001								0.078		
SB-59	SB-59-10	10 feet	07/19/2001				0.11			0.11			
B338	B338-34	12 feet	05/22/2014								0.084	5.57 J	
B339	B339-34	12 feet	05/22/2014								0.063		
B340	B340-34	12 feet	05/22/2014								0.14		
B342	B342-34	12 feet	05/23/2014								0.062	9.85 J	
B343	B343-34	12 feet	05/23/2014								0.31	8.71 J	
B348	B348-34	12 feet	05/27/2014									2.78 J	
GP19	GP19-12	12 feet	09/05/2006								0.16		
B338	B338-32	14 feet	05/22/2014								0.24	9.93 J	
B339	B339-32	14 feet	05/22/2014								0.076	4.92 J	
B340	B340-32	14 feet	05/22/2014								0.3	9.73 J	
B352	B352-32	14 feet	05/28/2014								0.24	4.53 J	
B353	B353-32	14 feet	05/28/2014								0.1	5.49 J	
SB-01	SB-01-14	14 feet	11/01/2000								0.058		
SB-02	SB-02-14	14 feet	11/01/2000								0.059		
B352	B352-30	16 feet	05/28/2014								0.17	4.57 J	
SB-59	SB-59-20	20 feet	07/19/2001								0.15		

Table D.7

Detected Exceedances in Soil—Semivolatile Organic Compounds and Dioxins/Furans [1]

			Chemical of Interest	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Chrysene	Indeno(1,2,3-c,d)pyrene	cPAH TEQ	Pentachlorophenol	Chlorinated dibenzo-p-dioxins	Chlorinated dibenzofurans
			CAS No.	56-55-3	205-99-2	207-08-9	50-32-8	218-01-9	193-39-5	CPAHTEQ	87-86-5	DIOX	FUR
			Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ng/kg	ng/kg
			PCUL [2]	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	2	2
Location	**Sample ID**	**Sample Depth**	**Sample Date**										
ASKO Property													
01MW15	SB-58-2	2 feet	07/19/2001	0.22				0.12		0.23			
SB-08	SB-08-5	5 feet	01/01/2001								0.056		
SB-06	SB-06-10	10 feet	01/01/2001								0.055		
01MW15	SB-58-15	15 feet	07/19/2001				0.1			0.21	0.16		
SB-06	SB-06-15	15 feet	01/01/2001								0.055		
SB-07	SB-07-15	15 feet	01/01/2001								0.057		
East Waterfront Property													
B314	B314-12.5	12.5 feet	11/06/2013	0.046	0.029	0.034		0.11	0.037	0.021			

Notes:

Empty cells indicate the sample had no detected exceedances for an analyte.

1 Only analytes with detected exceedances are included in this table. Refer to SES Remedial Investigation Reports (SES 2014a, 2014b, and 2014c) for all analytical results.

2 Pentachlorophenol is a proposed IHS in soil, and the PCUL is equivalent to the proposed cleanup level.

Abbreviations:

CAS Chemical Abstracts Service
cPAH Carcinogenic polycyclic aromatic hydrocarbon
mg/kg Milligrams per kilogram
PCUL Preliminary cleanup level
SES SoundEarth Strategies, Inc.
TEQ Toxicity equivalence

Qualifiers:

J Analyte was detected, concentration is considered to be an estimate.

Time Oil Bulk Terminal PPA

Supplemental Upland Remedial Investigation and Feasibility Study

Appendix E
Results of In Situ Stabilization/Solidification (ISS) Treatability Study

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Memorandum

Date:	12 September 2019
To:	Doug Ciserella and Mike Ciserella – Cantera Development Group, LLC
Copies to:	Kim Hempel – Pioneer Engineering and Environmental Services, LLC
From:	Chris Robb, Ken Mika, Jule Carr
Subject:	Results of *In situ* Stabilization/Solidification (ISS) Treatability Study for Time Oil Company, 2737, 2750, 2800, 2805 West Commodore Way; Seattle, WA

This memorandum was prepared on behalf of the Cantera Development Group, LLC (Cantera). This memorandum provides the results of the *In situ* Stabilization/Solidification (ISS) Treatability Study performed for the Time Oil Site (Site) located at 2737, 2750, 2800, 2805 West Commodore Way; Seattle, Washington. The Site has two parcels: ASKO hydraulic property ("AK") and Bulk Terminal property ("BT").

Sampling Summary

On March 14, 2019, Kim Hempel of Pioneer Engineering and Environmental Services, LLC (Pioneer) and Ken Mika of Geosyntec Consultants, Inc. (Geosyntec) mobilized to the Site to oversee sonic drilling and collect treatability study soil samples from four locations on Site; two from AK and two from BT (**Figure 1**). Holocene Drilling of Puyallup, Washington mobilized their sonic drill rig to the site utilizing a PQ core barrel (85 mm inside diameter; 122.6 mm outside diameter). Below is a summary of the sonic drilling and samples collected:

- TSB-02 (AK)
  - 0 to 5 feet below surface grade (bsg)– Tight gray silt and brown sand intermixed.
  - 5 to 10 feet bsg – Driller commented that soil was to tough to drill through for the sonic rig. Tight brown sands intermixed with gray silt. Silt had brown fine grain sand and one-inch round gravel seams with a petroleum odor. PID readings ranged from 0.03 to 3.1 parts per million (ppm). A sample from this interval was collected for the ISS treatability study.
  - 10 to 15 feet bsg – Top of sample (6-inches) was wet brown fine grain sand and then converted to very stiff gray silt that could not be broken by hand or foot pressure. The gray silt had an odor and a sample from this interval was collected for the ISS treatability study.

  - 15 to 20 feet bsg – Stiff wet gray silt intermixed with gray fine grain sand . There was no odor. A sample from this interval was collected for the ISS treatability study.
  - 20 to 25 feet bsg – Wet gray fine grain sand; no stiff characteristics. There was no odor. A sample from this interval was collected for the ISS and permeable reactive barrier (PRB) treatability studies. See separate Technical Memorandum on the PRB Treatability Study.
  - 25 to 30 feet bsg – Wet fine grain gray sand mixed with some gray silt. There was no odor. A sample from this interval was collected for the ISS and PRB treatability studies.
  - 30 to 35 feet bsg – Wet fine grain gray sand in the top foot. Remaining sample, gray silt and fine grain sand to very stiff gray clayey silt. There was no odor. A sample from this interval was collected for the PRB treatability study. End of boring.
- TSB-01 (AK)
  - 0 to 5 feet bsg – Fine grain gray silt with brown fine grain sane and organics. There was an odor.
  - 5 to 10 feet bsg – Fine grain brown sand with some gray silt. There was no odor.
  - 10 to 15 feet bsg – Stiff gray silt with sand seems and organics. A sample from this interval was collected for the ISS treatability study.
  - 15 to 20 feet bsg – Stiff gray silt with sand seems and organics. A sample from this interval was collected for the ISS treatability study.
  - 20 to 25 feet bsg – Wet brown fine grain sand. A sample from this interval was collected for the ISS treatability study.
  - 25 to 30 feet bsg – Wet brown fine grain sand and gray silt. Silt was a little stiff.
  - 30 to 35 feet bsg – Wet stiff gray silt with clay. End of boring.
- TSB-03 (BT)
  - 0 to 5 feet bsg – No recovery.
  - 5 to 10 feet bsg – Stiff wet gray silt with fine grain brown sand. There was an odor. PID reading of 20.3 ppm and PID headspace reading of 52.5 ppm. A sample from this interval was collected for the ISS treatability study.
  - 10 to 15 feet bsg – Wet fine grain gray sand. There was an odor. PID reading of 3.6 ppm and PID headspace reading of 26.3 ppm. A sample from this interval was collected for the ISS treatability study.
  - 15 to 20 feet bsg – Wet fine grain gray sand. At 20 feet, very stiff gray silt. There was an odor. A sample from this interval was collected for the ISS treatability study. End of boring.

- TSB-04 (BT)
    - 0 to 5 feet bsg – Wet brown fine grain sand and gravel in top foot. Then wet gray fine grain sand with an odor (PID head space reading 6.5PPM). Last six inches was wet gray silt with fine grain brown sand and an odor.
    - 5 to 10 feet bsg – Wet gray fine grain sand with gray silt with an odor. PID readings between 113 and 580.7 ppm and head space reading of 785 ppm. A sample from this interval was collected for the ISS treatability study.
    - 10 to 15 feet bsg - Wet gray fine grain sand with gray silt with an odor. PID head space readings between 8.4 and 34.7 ppm. A sample from this interval was collected for the ISS treatability study. End of boring.
- Groundwater was collected from the following monitoring wells:
    - 01MW71 (AK) – Two gallons
    - 01MW05 (BT) – Two gallons

Baseline Geologic Material Homogenization and Sampling

The soil samples were composited for the ISS treatability study on March 20, 2019. Soil samples were composited by weight and per property (ASKO and Bulk Terminal) and were assigned the Composite Sample ID's AK and BT, respectively (**Table 1**). Prior to compositing soils, each sample was sieved to remove debris and clumps larger than ½- inch in diameter that may interfere with the integrity of the sample due to the size of the molds for testing. The applicable ASTM methods require that the "largest particle contained within the test specimen be smaller than one tenth of the specimen diameter."

Following the compositing of soils, each property composite sample was tested for baseline geologic index property parameters including:

- Moisture content (Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass; ASTM D2216)
- pH (Standard Test Method for Measuring pH of Soil for Use in Corrosion Testing; ASTM G51)
- USCS soil classification (Standard Practice for Classification of Soils for Engineering Purposes; ASTM D2487)
- Grain size distribution (Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis; ASTM D6913)
- Atterberg limits (Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; ASTM D4318)
- Organic content (Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; ASTM D2974)
- Unit Weight (Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method; ASTM D2937M)

ASKO composite soils were classified as silt (ML) with a moisture content of 18.2%, organic content of 1.0%, and an in place bulk unit wet weight of 128.5 pounds per cubic foot (pcf). Bulk Terminal composite soils were classified as silty sand (SM) with a moisture content of 19.9%, organic content of 0.8%, and an in place bulk unit wet weight of 124.5 pcf. **Table 1** presents the results of the geotechnical index property testing. Geotechnical laboratory data reports are presented in **Appendix A**.

Following the compositing of soils, each Area composite sample was tested for analytical parameters including benzene, toluene, ethylbenzene, xylenes (BTEX), trichloroethene, cis-1,2-dichloroethene (EPA Method 8260C), and Gasoline Range Organics and Diesel Range Organics (EPA Method 8015D). **Table 2** presents the results of the laboratory analytical testing for the composite soils. Laboratory analytical data reports are presented in **Appendix B.**

Each property composite sample was sent to TestAmerica to characterize leaching in existing conditions in accordance with EPA Method 1316 "*Liquid to solid Partitioning as a Function of Liquid-to-Solid Ratio in Solid Materials Using Parallel Batch Procedure*".

The results of EPA Method 1316 testing are presented in **Table 3**. The following bullets details the calculations and their sequence:

- COC concentrations of liquid extracts for a range of liquid to solid ratio (0.5, 1, 2, 5, and 10) replicates. These are presented under concentrations of EPA Method 1316 extractions field in **Table 3**.

- Mass release of COCs were calculated based on the COC concentrations in liquid extracts and the corresponding liquid to solid ratios using **Equation 1**.

$$F = C * {}^{L}/_{S} \quad (1)$$

Where:

F COC mass release (mg/kg-dry);

C COC concentration in extractions (mg/L); and

L/S liquid to solid ratio of respective leaching vessel.

- COC leaching during pre-remediation conditions (via EPA Method 1316) will be compared to the COC leaching in post-remediation (via EPA Method 1315) to quantitatively determine the reduction in chemical leaching. However, EPA Method 1316 results are mass release per area and EPA Method 1315 results are mass release over time. Hence the results of two leach testing methods are not directly comparable. Based on the methodology presented in the *Bench-Scale Testing Report Pre-Design Investigations, Gowanus Canal, Brooklyn, New York* (EPA, 2013), liquid to solid ratios of each leaching vessels are correlated to a time based on the site-specific percolation rates (as presented in **Table 4**). Percolation rate is calculated using **Equation 2**. Calculated time related to L/S is used to graph and compare the EPA Method 1316 data to the EPA Method 1315 cumulative mass release over time results.

$$f = \frac{Q}{M_d} \quad (2)$$

Where:

f percolation rate (L/S/day);

Q specific discharge per unit area ($m^3/day/m^2$); and

M_d dry mass of soil per unit volume perpendicular to groundwater flow.

- COC mass releases per unit area of soil are calculated based on the COC mass release and soil mass per unit area within the targeted ISS horizontal thickness (in the direction of groundwater flow) using **Equation 3**.

$$F' = F * M_d \quad (3)$$

Where:

F' COC mass release per unit area (mg/m^2).

Mass release per unit area (F') can be plotted against the associated calculated time related to L/S for each presented test on **Table 3** and can be compared to EPA Method 1315 results.

Table 4 presents the site-specific features for each property. The Bulk Terminal property was split into two distinct areas to represent the light non-aqueous phase liquid (LNAPL) present at the site: Area A and Area B.

ISS Treatability Study

Materials

The ISS mixes included the following reagents:

- Portland Cement Type IL (OPC) (ASTM 150/150M), from LafargeHolcim
- Ground Granulated Blast Furnace Slag Cement (SC) Grade 100 (Standard Specification for Slag Cement for Use in Concrete and Mortars; ASTM C989/989M), from LafargeHolcim
- Premium Gel Bentonite from CETCO

Cement Mold Preparation

The ISS mixture was prepared by introducing the prepared grout with the soil composite and blending the grout and soil in a manner that mimics the proposed construction mixing method. ISS samples were prepared in general accordance with Standard Practice for Making and Curing Soil-Cement Compression and Flexure Test Specimens in the Laboratory (ASTM D1632) and cured at 100% humidity at standard temperature (between 20 and 25 degrees Celsius) immediately after mixing.

The ISS mixes used 50% potable water and 50% groundwater representative of each Area to evaluate the effects of Site COCs on the treated material and long-term durability. However, water used for mixing the cementitious grout during full-scale implementation will be a potable water. Groundwater will be mixed with the ISS grout during the in situ mixing and will comprise a portion of the final *in situ* mixture. Water to cement ratios ranged from 1.25 to 2.0 for mixing the ISS grout. The water to cement ratios were increased up to 2.0 for ISS mixes with bentonite due to the hydration of the bentonite prior to mixing with the cementitious reagents.

Geotechnical Testing

The ISS mixes were tested for pH (ASTM G51) immediately after mixing was completed. The ISS mixes were tested for moisture content (ASTM D2216), unit weight (ASTM D2937M), and Unconfined Compressive Strength (UCS; Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders; ASTM D1633) at 7, 14, and 28 days of cure. ISS mixes were also tested for hydraulic conductivity (Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter; ASTM D5084) at 28 days of cure.

Selected ISS mixes were evaluated for volume expansion after 28 days of cure to quantify the range of volumetric swell resulting from the mixing and reactions of the reagents with the composite soil samples. These measurements are simple comparisons of initial soil volume to final wet volume of each ISS mix design. Laboratory swell will only provide an indicator of the lower end of anticipated field behavior.

All of the ISS mixes exceeded the performance goal of 50 psi and a hydraulic conductivity of less than 1.0 x 10^{-6} cm/s at 28 days of curing. The ISS mixes were tested for pH immediately after preparation to observe any adverse effects to the final mixture. The ISS mix pH results were observed to be alkaline (> 11 S.U.), which is typical of cementitious grout reactions. Selected mixes were tested for volume expansion. **Table 5** presents the geotechnical results for all ISS mixes.

Leaching Testing

The ISS mixes were also tested for EPA Method 1315 *"Mass Transfer Rates of Constituents in Monolithic or Compacted Granular Materials Using a Semi-Dynamic Tank Leaching Procedure"*. The duration of the EPA Method 1315 test is typically 63 days and the eluate are tested at distinct intervals: 2 hours, 1 day, 2 days, 7 days, 14 days, 28 days, 42 days, 49 days, and 63 days. The following was performed to evaluate the post-ISS EPA Method 1315 data:

- Measured eluate concentrations from each sample collected at these distinct intervals are used to calculate interval mass release using **Equation 4**.

$$F_{t,i} = \frac{C_i * V_i}{A} \quad (4)$$

Where:

$F_{t,i}$ mass released during leaching interval i (mg/m^2);

C_i COC concentration in the eluate for leaching interval i (mg/L);

A surface area of the tested mold specimen exposed to the eluent (m^2).

- Cumulative mass release over time were calculated by summing the preceding interval mass releases using **Equation 5**.

$$F_t = \sum_{i=1}^{9} F_{t,i} \quad (5)$$

As both pre- and post-ISS treatment samples were evaluated to provide mass release over time, percent reduction in leaching was evaluated by comparing the cumulative mass release for select COCs calculated for untreated soil samples (based on EPA Method 1316) (**Table 4**) and ISS treated soil samples (EPA Method 1315) (**Table 6**) to assess preliminary relative chemical performance of the selected ISS mixes.

Because the time associated to L/S for EPA Method 1316 results ranged from 607 to 39,166 days and out of the range for the 63-day testing period of EPA Method 1315, the cumulative mass releases for the untreated soil samples were extrapolated based on the leaching duration of the ISS samples to directly compare percent reduction in leaching at a point in time. The extrapolation was done by creating a Power regression fit to EPA Method 1316 results. R-squared for these regressions ranged from 0.86 to 0.99 and therefore are considered good fits to empirically derived mass release curves. Using the Power regression fits, cumulative mass release over 63-day period

Table 6 presents the final EPA Method 1315 leaching results for the ISS mixes. **Table 7** presents the baseline cumulative mass release from untreated soils, semi-empirically determined cumulative mass release from ISS treated soils, and the percent reduction in leaching of COCs. Only COCs that had a baseline leaching detection for each property were evaluated for a reduction in leaching of the ISS-treated soils.

The following are the reduction of leaching results for the ISS Mixes on the ASKO hydraulic property:

- greater than 96% reduction in leachability of Gasoline Range Organics [C6 - C10],
- greater than 98% reduction in leachability of Diesel Range Organics [C10-C34], and
- greater than 99% reduction in leachability of Trichloroethene

The following are the reduction of leaching results for the ISS Mixes on the Bulk Terminal property:

- greater than 98% reduction in leachability of Gasoline Range Organics [C6 - C10],
- greater than 98% reduction in leachability of Diesel Range Organics [C10-C34],
- greater than 99% reduction in leachability of o-Xylene, and
- greater than 99% reduction in leachability of Total Xylenes.

The comparison of post-ISS leaching concentrations are based on conceptual ISS configurations that meet the Site cleanup objectives. The post-ISS leaching concentrations will be modified during design upon finalization of the site remedial approach and ISS treatment area configuration and geometry.

Post-ISS Groundwater Concentrations at Property Boundary

A conservative one-dimensional groundwater model was implemented to calculate the timeframe for the ISS treatment to meet target groundwater cleanup levels at the north boundary of West Commodore Way. Conceptual target groundwater concentrations were established for the following COCs:

- TCE – 0.5 ppb
- GRO – 800 ppb
- DRO – 500 ppb

Using the bulk soil data (**Table 1**), ISS-treated soil leaching data (**Table 6**), conceptual ISS configurations, and site hydrogeologic data (**Table 4**), groundwater concentrations adjacent to the ISS monolith were calculated. The Illinois EPA R26 equation (Predicted Concentrations for COCs in Groundwater at Property Boundary) was used to predict the groundwater concentrations at the north boundary of West Commodore Way over time using the calculated groundwater concentrations adjacent to the ISS monolith. Groundwater concentrations were predicted for each year to estimate the remediation timeframe for the ISS treatment to meet the target concentrations in groundwater at the north boundary of West Commodore Way. **Appendix C** presents the results.

For the ASKO hydraulic property, TCE, GRO, and DRO groundwater concentrations at the north boundary of West Commodore Way met the target groundwater concentrations at year 1 after ISS treatment. For the BT property, TCE and GRO groundwater concentrations at the north boundary of West Commodore Way met the target groundwater concentrations at year 1 after ISS treatment and at year 2 after ISS treatment for DRO. In addition, the COC groundwater concentrations continued to decrease over time.

Existing upgradient groundwater data were incorporated with the post-ISS groundwater concentrations to estimate the combined groundwater concentration after ISS implementation. For ASKO hydraulic property, TCE concentrations were above the target concentrations for the analyzed timeframe due to high source concentrations upgradient of the ISS areas and the analytical reporting limit exceeding the target concentration. For BT property, DRO concentrations were above the target concentrations for the first 13 years post-ISS. Therefore, addition of the permeable reactive barrier wall proposed for the ASKO hydraulic property may be required to decrease upgradient TCE concentrations to meet the target concentration at the north boundary of West Commodore Way.

The comparison of post-ISS groundwater concentrations at the north boundary of West Commodore Way are based on the target cleanup groundwater concentrations established prior to the completion of the Feasibility Study. The post-ISS groundwater concentrations at the north boundary of West Commodore Way will be modified during design upon finalization of the site remedial approach and ISS treatment area configuration and geometry.

Conclusions and Path Forward

Geotechnical and leaching results for the ISS mixes indicate that the site soils organic content and pH and contaminant concentrations in soil and groundwater have minimal impact on the implementation of the ISS treatment. In addition, the strength and hydraulic conductivity results far exceeded the initial performance criteria outlined in earlier sections.

The following observations were made during the treatability study:

- Mixes with bentonite additions tended to have a higher volume expansion than mixes with no bentonite addition. This is likely due to additional water required for hydration of bentonite prior to mixing with cement.
- There were no significant differences in the percent reduction of leaching between selected mixes for each property (bentonite and non-bentonite mixes).
- The percent reduction of leaching for each COC was similar between properties that had the same detected COCs, indicating that both properties can likely be treated with the same ISS mix design.

Geosyntec recommends that the following be considered for future design and implementation of the ISS remedy:

- Management of material expansion needs to be considered during the design process. Swell materials can be effectively managed on-site with proper design (i.e. benching prior to ISS implementation, reuse as backfill on-site). Material expansion reported in **Table 5** ranged from 20% to 40% depending on the mix design.
- The strength results suggest that the ISS treatment can be performed to support a variety of future reuse scenarios. Final selection of UCS design criteria can be performed during the design to support future redevelopment.
- The excellent strength and hydraulic conductivity results suggest there is opportunity to further refine the mix design and reduce the total cement content added to treat the soils. These refinements could result in significant cost savings.

Based on the geotechnical and leaching results of the ISS mix designs, a total cementitious addition of at least 12% will be considered for the design and implementation of the ISS treatment. Both combinations of Portland cement with bentonite and Portland cement with slag cement exceeded the performance criteria, therefore, no exclusions to reagents will be considered for the design and implementation of the ISS treatment; bentonite addition may be useful in difficult drilling conditions to provide additional drilling fluid.

Attachments:

Table 1 – Composite Soil Index Property Testing Results

Table 2 – Composite Soil Analytical Testing Results

Table 3 – Composite Soil Leaching Characteristics (EPA Method 1316)

Table 4 – Site Specific Features of ISS Areas

Table 5 – ISS-Treated Soils Geotechnical Results

Table 6 – ISS Treated Soils Leaching Characteristics (EPA Method 1315)

Table 7 – ISS Treated Soils Percent Reduction in Leaching

Figure 1 – ISS Treatability Study Boring Locations

Appendix A – Geotechnical Lab Reports

Appendix B – Analytical Lab Reports

Appendix C – Post-ISS Groundwater Concentrations at Property Boundary

* * * * *

TABLE 1
Composite Soil Index Property Testing
Time Oil
Seattle, WA

Composite Sample ID	Moisture Content (ASTM D2216)	pH (ASTM G51)	USCS Soil Classification (ASTM D2487)	Grain Size Distribution (ASTM D6913)			Atterberg Limits (ASTM D4318)			Organic Content (ASTM D2974)	In Place Density Determination (ASTM D2937)	
	%			% Finer 3/8" Sieve	% Finer #40 Sieve	% Finer #200 Sieve	L.L. %	P.L. %	P.I. %	%	Wet pcf	Dry pcf
AK	18.2	7.2	ML	99.2	96.6	55.7	18.0	17.0	1.0	1.0	128.5	107.8
BT	19.9	8.0	SM	95.1	85.5	24.8	NP	NP	NP	0.8	124.5	105.3

Notes:
mg/kg = milligrams per kilogram
pcf = pounds per cubic foot
NP = non-plastic
ASTM = American Society for Testing and Materials
USCS = Unified Soil Classification System
L.L = Liquid Limit
P.L. = Plastic limit
P.I. = Plasticity index

TABLE 2
Composite Soil Analytical Testing Results
Time Oil
Seattle, WA

Parameter	Unit	TO-CS-AK-01	TO-CS-BT-01
Gasoline Range Organics [C6 - C10]	ug/Kg	**240**	**720000**
Diesel Range Organics [C10-C34]	mg/Kg	**54**	**2000**
Benzene	ug/Kg	< 2.4	**180**
cis-1,2-Dichloroethene	ug/Kg	**2.2**	< 84
Ethylbenzene	ug/Kg	< 2.6	**2200**
m-Xylene & p-Xylene	ug/Kg	< 2.3	**5300**
o-Xylene	ug/Kg	< 2.9	**2900**
Toluene	ug/Kg	< 2	**530**
Trichloroethene	ug/Kg	**150**	< 80
Xylenes, Total	ug/Kg	< 5.2	**8100**

Notes:

< = result was below the MDL for the compound

mg/kg = milligrams per kilogram

ug/kg = micrograms per kilogram

TABLE 3
Composite Soil Leaching Characteristics (EPA Method 1316)
Time Oil
Seattle, WA

Area	AK				
Sample ID	TO-CS-AK-01				
Extraction ID	T01	T02	T03	T04	T05
Liquid/Solid	10	5	2	1	0.5
Concentrations of EPA Method 1316 Extractions (ug/L) [1]					
Gasoline Range Organics [C6 - C10]	160	150	220	250	310
Diesel Range Organics [C10-C34]	400	440	600	2,500	1,400
o-Terphenyl	120	120	130	130	180
Benzene	< 3	< 6	< 12	< 18	< 30
cis-1,2-Dichloroethene	< 3.5	< 7.1	< 14	< 21	< 35
Ethylbenzene	< 2.5	< 5.1	< 10	< 15	< 25
m-Xylene & p-Xylene	< 2.4	< 4.8	< 9.6	< 14	< 24
o-Xylene	< 2	< 4.1	< 8.1	< 12	< 20
Toluene	< 2.3	< 4.6	< 9.1	< 14	< 23
Trichloroethene	99	220	400	470	940
Xylenes, Total	< 4.5	< 8.9	< 18	< 27	< 45
Mass Release (mg/kg-dry) [2]					
Gasoline Range Organics [C6 - C10]	1.6	0.75	0.44	0.25	0.155
Diesel Range Organics [C10-C34]	4	2.2	1.2	2.5	0.7
o-Terphenyl	1.2	0.6	0.26	0.13	0.09
Benzene	0.03	0.03	0.024	0.018	0.015
cis-1,2-Dichloroethene	0.035	0.0355	0.028	0.021	0.0175
Ethylbenzene	0.025	0.0255	0.02	0.015	0.0125
m-Xylene & p-Xylene	0.024	0.024	0.0192	0.014	0.012
o-Xylene	0.02	0.0205	0.0162	0.012	0.01
Toluene	0.023	0.023	0.0182	0.014	0.0115
Trichloroethene	0.99	1.1	0.8	0.47	0.47
Xylenes, Total	0.045	0.0445	0.036	0.027	0.0225
Time Related to L/S (days) [3]					
Time	16,733	8,367	3,347	1,673	837
Mass Release per Unit Area (mg/m^2) [4]					
Gasoline Range Organics [C6 - C10]	143,698	67,359	39,517	22,453	13,921
Diesel Range Organics [C10-C34]	359,245	197,585	107,774	224,528	62,868
o-Terphenyl	107,774	53,887	23,351	11,675	8,083
Benzene	2,694	2,694	2,155	1,617	1,347
cis-1,2-Dichloroethene	3,143	3,188	2,515	1,886	1,572
Ethylbenzene	2,245	2,290	1,796	1,347	1,123
m-Xylene & p-Xylene	2,155	2,155	1,724	1,257	1,078
o-Xylene	1,796	1,841	1,455	1,078	898
Toluene	2,066	2,066	1,635	1,257	1,033
Trichloroethene	88,913	98,792	71,849	42,211	42,211
Xylenes, Total	4,042	3,997	3,233	2,425	2,021

Notes:
1. EPA Method 1316 testing analytical results provided by TestAmerica
2. Calculated based on extract concentrations and associated liquid-to-solid ratios
3. Calculated based on liquid-to-solid ratio and associated percolation rate calculated for the source area
4. Calculated based on mass release and soil mass per unit volume
ug/L = microgram per liter
mg/kg-dry = milligrams per kilogram, dry weight
L/S = Liquid to Solid ratio
mg/m^2 = milligrams per square meter
T0X = Extraction time step

TABLE 3
Composite Soil Leaching Characteristics (EPA Method 1316)
Time Oil
Seattle, WA

Area	TO-CS-BT-01 Area A					TO-CS-BT-01 Area B				
Sample ID	TO-CS-BT-01					TO-CS-BT-01				
Extraction ID	T01	T02	T03	T04	T05	T01	T02	T03	T04	T05
Liquid/Solid	10	5	2	1	0.5	10	5	2	1	0.5
Concentrations of EPA Method 1316 Extractions (ug/L) [1]										
Gasoline Range Organics [C6 - C10]	1200	1400	1600	2100	250000	1200	1400	1600	2100	250000
Diesel Range Organics [C10-C34]	10000	7800	13000	1700000	240000	10000	7800	13000	1700000	240000
o-Terphenyl	32	62	72	1600	100	32	62	72	1600	100
Benzene	0.6	0.6	6	12	24	0.6	0.6	6	12	24
cis-1,2-Dichloroethene	0.71	0.71	7.1	14	28	0.71	0.71	7.1	14	28
Ethylbenzene	0.51	0.51	5.1	10	20	0.51	0.51	5.1	10	20
m-Xylene & p-Xylene	0.48	0.48	4.8	9.6	19	0.48	0.48	4.8	9.6	19
o-Xylene	49	60	120	140	230	49	60	120	140	230
Toluene	0.46	0.46	4.6	9.1	18	0.46	0.46	4.6	9.1	18
Trichloroethene	0.69	0.69	6.9	14	28	0.69	0.69	6.9	14	28
Xylenes, Total	49	60	120	140	230	49	60	120	140	230
Mass Release (mg/kg-dry) [2]										
Gasoline Range Organics [C6 - C10]	12	7	3.2	2.1	125	12	7	3.2	2.1	125
Diesel Range Organics [C10-C34]	100	39	26	1700	120	100	39	26	1700	120
o-Terphenyl	0.32	0.31	0.144	1.6	0.05	0.32	0.31	0.144	1.6	0.05
Benzene	0.006	0.003	0.012	0.012	0.012	0.006	0.003	0.012	0.012	0.012
cis-1,2-Dichloroethene	0.0071	0.00355	0.0142	0.014	0.014	0.0071	0.00355	0.0142	0.014	0.014
Ethylbenzene	0.0051	0.00255	0.0102	0.01	0.01	0.0051	0.00255	0.0102	0.01	0.01
m-Xylene & p-Xylene	0.0048	0.0024	0.0096	0.0096	0.0095	0.0048	0.0024	0.0096	0.0096	0.0095
o-Xylene	0.49	0.3	0.24	0.14	0.115	0.49	0.3	0.24	0.14	0.115
Toluene	0.0046	0.0023	0.0092	0.0091	0.009	0.0046	0.0023	0.0092	0.0091	0.009
Trichloroethene	0.0069	0.00345	0.0138	0.014	0.014	0.0069	0.00345	0.0138	0.014	0.014
Xylenes, Total	0.49	0.3	0.24	0.14	0.115	0.49	0.3	0.24	0.14	0.115
Time Related to L/S (days) [3]										
Time	88,037	44,018	17,607	8,804	4,402	34,660	17,330	6,932	3,466	1,733
Mass Release per Unit Area (mg/m^2) [4]										
Gasoline Range Organics [C6 - C10]	1,484,067	865,706	395,751	259,712	15,459,036	584,279	340,829	155,808	102,249	6,086,235
Diesel Range Organics [C10-C34]	12,367,229	4,823,219	3,215,479	210,242,888	14,840,674	4,868,988	1,898,905	1,265,937	82,772,791	5,842,785
o-Terphenyl	39,575	38,338	17,809	197,876	6,184	15,581	15,094	7,011	77,904	2,434
Benzene	742	371	1,484	1,484	1,484	292	146	584	584	584
cis-1,2-Dichloroethene	878	439	1,756	1,731	1,731	346	173	691	682	682
Ethylbenzene	631	315	1,261	1,237	1,237	248	124	497	487	487
m-Xylene & p-Xylene	594	297	1,187	1,187	1,175	234	117	467	467	463
o-Xylene	60,599	37,102	29,681	17,314	14,222	23,858	14,607	11,686	6,817	5,599
Toluene	569	284	1,138	1,125	1,113	224	112	448	443	438
Trichloroethene	853	427	1,707	1,731	1,731	336	168	672	682	682
Xylenes, Total	60,599	37,102	29,681	17,314	14,222	23,858	14,607	11,686	6,817	5,599

Notes:
1. EPA Method 1316 testing analytical results provided by TestAmerica
2. Calculated based on extract concentrations and associated liquid-to-solid ratios
3. Calculated based on liquid-to-solid ratio and associated percolation rate calculated for the source area
4. Calculated based on mass release and soil mass per unit volume

ug/L = microgram per liter
mg/kg-dry = milligrams per kilogram, dry weight
L/S = Liquid to Solid ratio
mg/m^2 = milligrams per square meter
T0X = Extraction time step

TABLE 4
Site Specific Features of ISS Areas
Time Oil
Seattle, WA

Parameter	Unit	Property			Notes
		ASKO	Bulk Terminal		
			Area A	Area B	
Properties of the ISS Area					
ISS Cross-section Area Perpendicular to Flow	sq-ft	19,515	6,646	15,233	Assumed area of ISS treatment.
ISS Thickness Along Flow Direction (Vertical)	ft	30	12	23	Assumed depth of ISS treatment.
ISS Thickness Along Flow Direction (Horizontal)	ft	50	254	100	Assumed width of ISS treatment perpendicular to flow direction.
Mass per Unit Volume	kg-dry	25,660	123,672	48,690	Calculated based on dry density and ISS thickness
Hydrogeological Parameters					
Specific Discharge per Unit Area	m/day	0.054	0.014	0.014	From un-treated hydrualic conductivity
Percolation Rate	(L/S)/day	0.00209	0.00011	0.00029	Calculated based on dry density, ISS thickness, and specific discharge

Notes:
sq-m = square meters
m = meters
kg-dry = mass of soil in kilograms, dry
m/day = meters per day
(L/S)/day = Liquid to Solid ratio per day

TABLE 5
ISS Treated Soils Geotechnical Results
Time Oil
Seattle, WA

Property	Design Mix [1,2]	Mix Date	Total Cementitious [3]	Reagents		Filler	Water : Reagents Ratio [1,5]	GW Sample [5]	Lab Results									Selected for Leaching Analysis
				Portland Cement Type IL [OPC] (%) [1]	GGBFS [SC] (%) [1]	Bentonite (%) [1,4]			pH	Average Moisture Content (%)	Average Wet Density (pcf)	Average Dry Density (pcf)	Volume Expansion Evaluation [6]	UCS (psi) (ASTM D2166)			Hydraulic Conductivity (cm/sec) [K] (ASTM D5084)	
														7-Day	14-Day	28-Day	28-Day	
AK	Mix-AK-1-12%OPC/0.5%B	3/22/2019	12	12		0.5	2.0	01MW71	12.7	34.9	115.1	85.3	40.5%	159.4	204.4	298.2	2.70E-08	X
	Mix-AK-2-4%OPC/12%SC	3/22/2019	16	4	12		1.5	01MW71	12.6	34.2	116.0	86.4		189.2	275.1	557.4	1.30E-08	
	Mix-AK-3-3%OPC/9%SC	3/22/2019	12	3	9		1.5	01MW71	12.4	30.9	117.5	89.7	30.4%	174.5	267.5	510.8	1.50E-08	X
BT	Mix-BT-1-12%OPC/0.5%B	3/25/2019	12	12		0.5	1.5	01MW05	12.5	28.9	119.7	92.9	24.3%	108.6	138.8	203.1	2.00E-07	X
	Mix-BT-2-4%OPC/12%SC	3/25/2019	16	4	12		1.25	01MW05	12.9	29.1	119.4	92.5		191.6	358.7	648.3	2.20E-08	
	Mix-BT-3-3%OPC/9%SC	3/25/2019	12	3	9		1.25	01MW05	12.5	27.2	121.4	95.4	20.4%	124.8	234.3	494.2	3.10E-08	X

Notes:

1. All reagent additions are by dry weight of soil.
2. Cast samples for strength and hydraulic conductivity testing were minimum 2-inch dia. by 4-inch height or 3-inch dia. x 6-inch height and cured at 100% humidity at standard temperature.
3. Total cement refers to the combined total of Portland cement and slag cement.
4. The as-received bentonite was added to the mix water and hydrated prior to mixing with the cement to produce the cement bentonite grout to mix with the soil.
5. Mix water was 50%potable water and 50% groundwater (GW).
6. The volume expansion evaluation was be measured and reported after 28 days.

ASTM: American Society of Testing and Materials International
GGBFS: Ground Granulated Blast Furnace Slag
UCS: Unconfined Compressive Strength

TABLE 6
ISS Treated Soils Leaching Characteristics (EPA Method 1315)
Time Oil
Seattle, WA

Mix Design ID	Property	Test ID	Leach Testing Parameters						Gasoline Range Organics [C6 - C10]					
			Surface Area [1]	ISS Mass [2]	Sample Density [3]	Eluate Volume [4]	Soil Dry Density [5]	Time Interval	Total Soil Concentration [6]	Eluate Concentration [7]	Interval Mass Release [8]	Interval Mass Flux [8]	Cumulative Mass Release [8]	Diffusivity [8]
			(cm^2)	(g)	(kg/m^3)	(L)	(kg/m^3)	(days)	(mg/kg)	(mg/L)	(mg/m^2)	(mg/m^2/sec)	(mg/m^2)	(m^2/sec)
TO-ISS-AK-01	Ak	TO-ISS-AK-01 T01	172.3	369.8	1842	1.798	1366	0.08	240	0.049	5.114	7.40E-04	5.114	2.77E-14
		TO-ISS-AK-01 T02						1	240	0.049	5.114	6.43E-05	10.228	4.30E-15
		TO-ISS-AK-01 T03						2	240	0.049	5.114	3.08E-05	15.342	1.29E-14
		TO-ISS-AK-01 T04						7	240	0.049	5.114	8.55E-06	20.455	1.46E-15
		TO-ISS-AK-01 T05						14	240	0.05	5.218	4.34E-06	25.674	1.92E-15
		TO-ISS-AK-01 T06						28	240	0.049	5.114	2.12E-06	30.788	9.21E-16
		TO-ISS-AK-01 T07						42	240	0.055	5.740	1.58E-06	36.528	1.97E-15
		TO-ISS-AK-01 T08						49	240	0.049	5.114	1.21E-06	41.641	8.21E-15
		TO-ISS-AK-01 T09						63	240	0.049	5.114	9.41E-07	46.755	2.52E-15
TO-ISS-AK-03	AK	TO-ISS-AK-03 T01	172.3	381	1885	1.798	1440	0.08	240	0.049	5.114	7.40E-04	5.114	2.49E-14
		TO-ISS-AK-03 T02						1	240	0.049	5.114	6.43E-05	10.228	3.87E-15
		TO-ISS-AK-03 T03						2	240	0.049	5.114	3.08E-05	15.342	1.16E-14
		TO-ISS-AK-03 T04						7	240	0.049	5.114	8.55E-06	20.455	1.31E-15
		TO-ISS-AK-03 T05						14	240	0.049	5.114	4.25E-06	25.569	1.66E-15
		TO-ISS-AK-03 T06						28	240	0.049	5.114	2.12E-06	30.683	8.28E-16
		TO-ISS-AK-03 T07						42	240	0.049	5.114	1.41E-06	35.797	1.41E-15
		TO-ISS-AK-03 T08						49	240	0.049	5.114	1.21E-06	40.911	7.38E-15
		TO-ISS-AK-03 T09						63	240	0.049	5.114	9.41E-07	46.025	2.26E-15
TO-ISS-BT-01	BT	TO-ISS-BT-01 T01	172.3	377.8	1917	1.798	1488	0.08	720000	0.049	5.114	7.40E-04	5.114	2.59E-21
		TO-ISS-BT-01 T02						1	720000	0.049	5.114	6.43E-05	10.228	4.03E-22
		TO-ISS-BT-01 T03						2	720000	0.049	5.114	3.08E-05	15.342	1.21E-21
		TO-ISS-BT-01 T04						7	720000	0.049	5.114	8.55E-06	20.455	1.37E-22
		TO-ISS-BT-01 T05						14	720000	0.082	8.558	7.12E-06	29.013	4.83E-22
		TO-ISS-BT-01 T06						28	720000	0.096	10.019	4.15E-06	39.032	3.31E-22
		TO-ISS-BT-01 T07						42	720000	0.16	16.698	4.61E-06	55.731	1.56E-21
		TO-ISS-BT-01 T08						49	720000	0.049	5.114	1.21E-06	60.845	7.69E-22
		TO-ISS-BT-01 T09						63	720000	0.11	11.480	2.11E-06	72.325	1.19E-21
TO-ISS-BT-03	BT	TO-ISS-BT-03 T01	172.3	387.7	1944.646	1.798	1529	0.08	720000	0.049	5.114	7.40E-04	5.114	2.45E-21
		TO-ISS-BT-03 T02						1	720000	0.049	5.114	6.43E-05	10.228	3.81E-22
		TO-ISS-BT-03 T03						2	720000	0.049	5.114	3.08E-05	15.342	1.14E-21
		TO-ISS-BT-03 T04						7	720000	0.049	5.114	8.55E-06	20.455	1.29E-22
		TO-ISS-BT-03 T05						14	720000	0.07	7.306	6.07E-06	27.761	3.33E-22
		TO-ISS-BT-03 T06						28	720000	0.05	5.218	2.16E-06	32.979	8.51E-23
		TO-ISS-BT-03 T07						42	720000	0.06	6.262	1.73E-06	39.241	2.08E-22
		TO-ISS-BT-03 T08						49	720000	0.049	5.114	1.21E-06	44.355	7.28E-22
		TO-ISS-BT-03 T09						63	720000	0.049	5.114	9.41E-07	49.469	2.23E-22

Notes:

1. Based on the dimensions of tested ISS molds
2. Based on reported weight of ISS molds by TestAmerica
3. Bulk density of ISS treated soils
4. Volume of eluate used in leach testing. Provided by TestAmerica
5. Dry density of soil as reported by geotechnical laboratory
6. Total COC concentration of soil as reported by TestAmerica
7. EPA Method 1315 testing analytical results provided by TestAmerica
8. Calculated in accordance with the procedure outlined in EPA Method 1315

cm^3 = cubic centimeters
g = grams
kg/m^3 = kilograms per cubic meter
L = liter
mg/m^2 = milligrams per square meter
mg/kg = milligrams per kilogram
mg/m^2/sec = milligrams per square meter per second
m^2/sec = square meters per second

TABLE 6
ISS Treated Soils Leaching Characteristics (EPA Method 1315)
Time Oil
Seattle, WA

Mix Design ID	Property	Test ID	Leach Testing Parameters						Diesel Range Organics [C10-C34]					
			Surface Area [1]	ISS Mass [2]	Sample Density [3]	Eluate Volume [4]	Soil Dry Density [5]	Time Interval	Total Soil Concentration [6]	Eluate Concentration [7]	Interval Mass Release [8]	Interval Mass Flux [8]	Cumulative Mass Release [8]	Diffusivity [8]
			(cm^2)	(g)	(kg/m^3)	(L)	(kg/m^3)	(days)	(mg/kg)	(mg/L)	(mg/m^2)	(mg/m^2/sec)	(mg/m^2)	(m^2/sec)
TO-ISS-AK-01	Ak	TO-ISS-AK-01 T01	172.3	369.8	1842	1.798	1366	0.08	54	0.2	20.873	3.02E-03	20.873	9.10E-12
		TO-ISS-AK-01 T02						1	54	0.2	20.873	2.63E-04	41.746	1.42E-12
		TO-ISS-AK-01 T03						2	54	0.2	20.873	1.26E-04	62.619	4.25E-12
		TO-ISS-AK-01 T04						7	54	0.2	20.873	3.49E-05	83.492	4.80E-13
		TO-ISS-AK-01 T05						14	54	0.2	20.873	1.74E-05	104.365	6.06E-13
		TO-ISS-AK-01 T06						28	54	0.29	30.266	1.25E-05	134.630	6.38E-13
		TO-ISS-AK-01 T07						42	54	0.24	25.048	6.92E-06	159.678	7.42E-13
		TO-ISS-AK-01 T08						49	54	0.23	24.004	5.68E-06	183.682	3.57E-12
		TO-ISS-AK-01 T09						63	54	0.24	25.048	4.61E-06	208.729	1.19E-12
TO-ISS-AK-03	AK	TO-ISS-AK-03 T01	172.3	381	1885	1.798	1440	0.08	54	0.2	20.873	3.02E-03	20.873	8.18E-12
		TO-ISS-AK-03 T02						1	54	0.2	20.873	2.63E-04	41.746	1.27E-12
		TO-ISS-AK-03 T03						2	54	0.2	20.873	1.26E-04	62.619	3.82E-12
		TO-ISS-AK-03 T04						7	54	0.2	20.873	3.49E-05	83.492	4.32E-13
		TO-ISS-AK-03 T05						14	54	0.2	20.873	1.74E-05	104.365	5.45E-13
		TO-ISS-AK-03 T06						28	54	0.24	25.048	1.04E-05	129.412	3.92E-13
		TO-ISS-AK-03 T07						42	54	0.23	24.004	6.63E-06	153.416	6.12E-13
		TO-ISS-AK-03 T08						49	54	0.2	20.873	4.94E-06	174.289	2.43E-12
		TO-ISS-AK-03 T09						63	54	0.21	21.917	4.03E-06	196.206	8.22E-13
TO-ISS-BT-01	BT	TO-ISS-BT-01 T01	172.3	377.8	1917	1.798	1488	0.08	2000	0.2	20.873	3.02E-03	20.873	5.59E-15
		TO-ISS-BT-01 T02						1	2000	0.39	40.702	5.12E-04	61.575	3.31E-15
		TO-ISS-BT-01 T03						2	2000	0.22	22.960	1.38E-04	84.535	3.16E-15
		TO-ISS-BT-01 T04						7	2000	0.53	55.313	9.25E-05	139.849	2.07E-15
		TO-ISS-BT-01 T05						14	2000	0.48	50.095	4.17E-05	189.944	2.15E-15
		TO-ISS-BT-01 T06						28	2000	0.66	68.881	2.86E-05	258.824	2.03E-15
		TO-ISS-BT-01 T07						42	2000	0.54	56.357	1.56E-05	315.181	2.31E-15
		TO-ISS-BT-01 T08						49	2000	0.4	41.746	9.88E-06	356.927	6.64E-15
		TO-ISS-BT-01 T09						63	2000	0.59	61.575	1.13E-05	418.502	4.43E-15
TO-ISS-BT-03	BT	TO-ISS-BT-03 T01	172.3	387.7	1944.646	1.798	1529	0.08	2000	0.2	20.873	3.02E-03	20.873	5.30E-15
		TO-ISS-BT-03 T02						1	2000	0.2	20.873	2.63E-04	41.746	8.24E-16
		TO-ISS-BT-03 T03						2	2000	0.2	20.873	1.26E-04	62.619	2.47E-15
		TO-ISS-BT-03 T04						7	2000	0.24	25.048	4.19E-05	87.666	4.02E-16
		TO-ISS-BT-03 T05						14	2000	0.2	20.873	1.74E-05	108.539	3.53E-16
		TO-ISS-BT-03 T06						28	2000	0.32	33.397	1.38E-05	141.936	4.51E-16
		TO-ISS-BT-03 T07						42	2000	0.52	54.270	1.50E-05	196.206	2.02E-15
		TO-ISS-BT-03 T08						49	2000	0.23	24.004	5.68E-06	220.209	2.08E-15
		TO-ISS-BT-03 T09						63	2000	0.27	28.178	5.18E-06	248.388	8.79E-16

Notes:

1. Based on the dimensions of tested ISS molds
2. Based on reported weight of ISS molds by TestAmerica
3. Bulk density of ISS treated soils
4. Volume of eluate used in leach testing. Provided by TestAmerica
5. Dry density of soil as reported by geotechnical laboratory
6. Total COC concentration of soil as reported by TestAmerica
7. EPA Method 1315 testing analytical results provided by TestAmerica
8. Calculated in accordance with the procedure outlined in EPA Method 1315

cm^3 = cubic centimeters
g = grams
kg/m^3 = kilograms per cubic meter
L = liter
mg/m^2 = milligrams per square meter
mg/kg = milligrams per kilogram
mg/m^2/sec = milligrams per square meter per second
m^2/sec = square meters per second

TABLE 6
ISS Treated Soils Leaching Characteristics (EPA Method 1315)
Time Oil
Seattle, WA

Mix Design ID	Property	Test ID	Leach Testing Parameters						Benzene					
			Surface Area [1]	ISS Mass [2]	Sample Density [3]	Eluate Volume [4]	Soil Dry Density [5]	Time Interval	Total Soil Concentration [6]	Eluate Concentration [7]	Interval Mass Release [8]	Interval Mass Flux [8]	Cumulative Mass Release [8]	Diffusivity [8]
			(cm^2)	(g)	(kg/m^3)	(L)	(kg/m^3)	(days)	(mg/kg)	(mg/L)	(mg/m^2)	(mg/m^2/sec)	(mg/m^2)	(m^2/sec)
TO-ISS-AK-01	Ak	TO-ISS-AK-01 T01	172.3	369.8	1842	1.798	1366	0.08	2.4	0.0006	0.063	9.06E-06	0.063	4.15E-14
		TO-ISS-AK-01 T02						1	2.4	0.0006	0.063	7.88E-07	0.125	6.45E-15
		TO-ISS-AK-01 T03						2	2.4	0.0006	0.063	3.77E-07	0.188	1.93E-14
		TO-ISS-AK-01 T04						7	2.4	0.0006	0.063	1.05E-07	0.250	2.19E-15
		TO-ISS-AK-01 T05						14	2.4	0.0006	0.063	5.21E-08	0.313	2.76E-15
		TO-ISS-AK-01 T06						28	2.4	0.0006	0.063	2.60E-08	0.376	1.38E-15
		TO-ISS-AK-01 T07						42	2.4	0.0006	0.063	1.73E-08	0.438	2.35E-15
		TO-ISS-AK-01 T08						49	2.4	0.0006	0.063	1.48E-08	0.501	1.23E-14
		TO-ISS-AK-01 T09						63	2.4	0.0006	0.063	1.15E-08	0.564	3.78E-15
TO-ISS-AK-03	AK	TO-ISS-AK-03 T01	172.3	381	1885	1.798	1440	0.08	2.4	0.0006	0.063	9.06E-06	0.063	3.73E-14
		TO-ISS-AK-03 T02						1	2.4	0.0006	0.063	7.88E-07	0.125	5.80E-15
		TO-ISS-AK-03 T03						2	2.4	0.0006	0.063	3.77E-07	0.188	1.74E-14
		TO-ISS-AK-03 T04						7	2.4	0.0006	0.063	1.05E-07	0.250	1.97E-15
		TO-ISS-AK-03 T05						14	2.4	0.0006	0.063	5.21E-08	0.313	2.48E-15
		TO-ISS-AK-03 T06						28	2.4	0.0006	0.063	2.60E-08	0.376	1.24E-15
		TO-ISS-AK-03 T07						42	2.4	0.0006	0.063	1.73E-08	0.438	2.11E-15
		TO-ISS-AK-03 T08						49	2.4	0.0006	0.063	1.48E-08	0.501	1.11E-14
		TO-ISS-AK-03 T09						63	2.4	0.0006	0.063	1.15E-08	0.564	3.40E-15
TO-ISS-BT-01	BT	TO-ISS-BT-01 T01	172.3	377.8	1917	1.798	1488	0.08	180	0.0006	0.063	9.06E-06	0.063	6.21E-18
		TO-ISS-BT-01 T02						1	180	0.0006	0.063	7.88E-07	0.125	9.67E-19
		TO-ISS-BT-01 T03						2	180	0.0006	0.063	3.77E-07	0.188	2.90E-18
		TO-ISS-BT-01 T04						7	180	0.0006	0.063	1.05E-07	0.250	3.28E-19
		TO-ISS-BT-01 T05						14	180	0.0006	0.063	5.21E-08	0.313	4.14E-19
		TO-ISS-BT-01 T06						28	180	0.0006	0.063	2.60E-08	0.376	2.07E-19
		TO-ISS-BT-01 T07						42	180	0.0006	0.063	1.73E-08	0.438	3.52E-19
		TO-ISS-BT-01 T08						49	180	0.0006	0.063	1.48E-08	0.501	1.84E-18
		TO-ISS-BT-01 T09						63	180	0.0006	0.063	1.15E-08	0.564	5.66E-19
TO-ISS-BT-03	BT	TO-ISS-BT-03 T01	172.3	387.7	1944.646	1.798	1529	0.08	180	0.0006	0.063	9.06E-06	0.063	5.88E-18
		TO-ISS-BT-03 T02						1	180	0.0006	0.063	7.88E-07	0.125	9.15E-19
		TO-ISS-BT-03 T03						2	180	0.0006	0.063	3.77E-07	0.188	2.74E-18
		TO-ISS-BT-03 T04						7	180	0.0006	0.063	1.05E-07	0.250	3.10E-19
		TO-ISS-BT-03 T05						14	180	0.0006	0.063	5.21E-08	0.313	3.92E-19
		TO-ISS-BT-03 T06						28	180	0.0006	0.063	2.60E-08	0.376	1.96E-19
		TO-ISS-BT-03 T07						42	180	0.0006	0.063	1.73E-08	0.438	3.33E-19
		TO-ISS-BT-03 T08						49	180	0.0006	0.063	1.48E-08	0.501	1.75E-18
		TO-ISS-BT-03 T09						63	180	0.0006	0.063	1.15E-08	0.564	5.36E-19

Notes:

1. Based on the dimensions of tested ISS molds
2. Based on reported weight of ISS molds by TestAmerica
3. Bulk density of ISS treated soils
4. Volume of eluate used in leach testing. Provided by TestAmerica
5. Dry density of soil as reported by geotechnical laboratory
6. Total COC concentration of soil as reported by TestAmerica
7. EPA Method 1315 testing analytical results provided by TestAmerica
8. Calculated in accordance with the procedure outlined in EPA Method 1315

cm^3 = cubic centimeters
g = grams
kg/m^3 = kilograms per cubic meter
L = liter
mg/m^2 = milligrams per square meter
mg/kg = milligrams per kilogram
mg/m^2/sec = milligrams per square meter per second
m^2/sec = square meters per second

TABLE 6
ISS Treated Soils Leaching Characteristics (EPA Method 1315)
Time Oil
Seattle, WA

Mix Design ID	Property	Test ID	Leach Testing Parameters						cis-1,2-Dichloroethene					
			Surface Area [1]	ISS Mass [2]	Sample Density [3]	Eluate Volume [4]	Soil Dry Density [5]	Time Interval	Total Soil Concentration [6]	Eluate Concentration [7]	Interval Mass Release [8]	Interval Mass Flux [8]	Cumulative Mass Release [8]	Diffusivity [8]
			(cm^2)	(g)	(kg/m^3)	(L)	(kg/m^3)	(days)	(mg/kg)	(mg/L)	(mg/m^2)	(mg/m^2/sec)	(mg/m^2)	(m^2/sec)
TO-ISS-AK-01	Ak	TO-ISS-AK-01 T01	172.3	369.8	1842	1.798	1366	0.08	2.2	0.00071	0.074	1.07E-05	0.074	6.91E-14
		TO-ISS-AK-01 T02						1	2.2	0.00071	0.074	9.32E-07	0.148	1.08E-14
		TO-ISS-AK-01 T03						2	2.2	0.00071	0.074	4.47E-07	0.222	3.22E-14
		TO-ISS-AK-01 T04						7	2.2	0.00071	0.074	1.24E-07	0.296	3.65E-15
		TO-ISS-AK-01 T05						14	2.2	0.00071	0.074	6.16E-08	0.370	4.60E-15
		TO-ISS-AK-01 T06						28	2.2	0.00071	0.074	3.07E-08	0.445	2.30E-15
		TO-ISS-AK-01 T07						42	2.2	0.00071	0.074	2.05E-08	0.519	3.91E-15
		TO-ISS-AK-01 T08						49	2.2	0.00071	0.074	1.75E-08	0.593	2.05E-14
		TO-ISS-AK-01 T09						63	2.2	0.00071	0.074	1.36E-08	0.667	6.30E-15
TO-ISS-AK-03	AK	TO-ISS-AK-03 T01	172.3	381	1885	1.798	1440	0.08	2.2	0.00071	0.074	1.07E-05	0.074	6.21E-14
		TO-ISS-AK-03 T02						1	2.2	0.00071	0.074	9.32E-07	0.148	9.67E-15
		TO-ISS-AK-03 T03						2	2.2	0.00071	0.074	4.47E-07	0.222	2.90E-14
		TO-ISS-AK-03 T04						7	2.2	0.00071	0.074	1.24E-07	0.296	3.28E-15
		TO-ISS-AK-03 T05						14	2.2	0.00071	0.074	6.16E-08	0.370	4.14E-15
		TO-ISS-AK-03 T06						28	2.2	0.00071	0.074	3.07E-08	0.445	2.07E-15
		TO-ISS-AK-03 T07						42	2.2	0.00071	0.074	2.05E-08	0.519	3.51E-15
		TO-ISS-AK-03 T08						49	2.2	0.00071	0.074	1.75E-08	0.593	1.84E-14
		TO-ISS-AK-03 T09						63	2.2	0.00071	0.074	1.36E-08	0.667	5.66E-15
TO-ISS-BT-01	BT	TO-ISS-BT-01 T01	172.3	377.8	1917	1.798	1488	0.08	84	0.00071	0.074	1.07E-05	0.074	4.00E-17
		TO-ISS-BT-01 T02						1	84	0.00071	0.074	9.32E-07	0.148	6.22E-18
		TO-ISS-BT-01 T03						2	84	0.00071	0.074	4.47E-07	0.222	1.86E-17
		TO-ISS-BT-01 T04						7	84	0.00071	0.074	1.24E-07	0.296	2.11E-18
		TO-ISS-BT-01 T05						14	84	0.00071	0.074	6.16E-08	0.370	2.66E-18
		TO-ISS-BT-01 T06						28	84	0.00071	0.074	3.07E-08	0.445	1.33E-18
		TO-ISS-BT-01 T07						42	84	0.00071	0.074	2.05E-08	0.519	2.26E-18
		TO-ISS-BT-01 T08						49	84	0.00071	0.074	1.75E-08	0.593	1.19E-17
		TO-ISS-BT-01 T09						63	84	0.00071	0.074	1.36E-08	0.667	3.64E-18
TO-ISS-BT-03	BT	TO-ISS-BT-03 T01	172.3	387.7	1944.646	1.798	1529	0.08	84	0.00071	0.074	1.07E-05	0.074	3.78E-17
		TO-ISS-BT-03 T02						1	84	0.00071	0.074	9.32E-07	0.148	5.88E-18
		TO-ISS-BT-03 T03						2	84	0.00071	0.074	4.47E-07	0.222	1.76E-17
		TO-ISS-BT-03 T04						7	84	0.00071	0.074	1.24E-07	0.296	2.00E-18
		TO-ISS-BT-03 T05						14	84	0.00071	0.074	6.16E-08	0.370	2.52E-18
		TO-ISS-BT-03 T06						28	84	0.00071	0.074	3.07E-08	0.445	1.26E-18
		TO-ISS-BT-03 T07						42	84	0.00071	0.074	2.05E-08	0.519	2.14E-18
		TO-ISS-BT-03 T08						49	84	0.00071	0.074	1.75E-08	0.593	1.12E-17
		TO-ISS-BT-03 T09						63	84	0.00071	0.074	1.36E-08	0.667	3.45E-18

Notes:

1. Based on the dimensions of tested ISS molds
2. Based on reported weight of ISS molds by TestAmerica
3. Bulk density of ISS treated soils
4. Volume of eluate used in leach testing. Provided by TestAmerica
5. Dry density of soil as reported by geotechnical laboratory
6. Total COC concentration of soil as reported by TestAmerica
7. EPA Method 1315 testing analytical results provided by TestAmerica
8. Calculated in accordance with the procedure outlined in EPA Method 1315

cm^3 = cubic centimeters
g = grams
kg/m^3 = kilograms per cubic meter
L = liter
mg/m^2 = milligrams per square meter
mg/kg = milligrams per kilogram
mg/m^2/sec = milligrams per square meter per second
m^2/sec = square meters per second

TABLE 6
ISS Treated Soils Leaching Characteristics (EPA Method 1315)
Time Oil
Seattle, WA

Mix Design ID	Property	Test ID	Leach Testing Parameters						Ethylbenzene					
			Surface Area [1]	ISS Mass [2]	Sample Density [3]	Eluate Volume [4]	Soil Dry Density [5]	Time Interval	Total Soil Concentration [6]	Eluate Concentration [7]	Interval Mass Release [8]	Interval Mass Flux [8]	Cumulative Mass Release [8]	Diffusivity [8]
			(cm^2)	(g)	(kg/m^3)	(L)	(kg/m^3)	(days)	(mg/kg)	(mg/L)	(mg/m^2)	(mg/m^2/sec)	(mg/m^2)	(m^2/sec)
TO-ISS-AK-01	Ak	TO-ISS-AK-01 T01	172.3	369.8	1842	1.798	1366	0.08	2.6	0.00051	0.053	7.70E-06	0.053	2.55E-14
		TO-ISS-AK-01 T02						1	2.6	0.00051	0.053	6.70E-07	0.106	3.97E-15
		TO-ISS-AK-01 T03						2	2.6	0.00051	0.053	3.21E-07	0.160	1.19E-14
		TO-ISS-AK-01 T04						7	2.6	0.00051	0.053	8.90E-08	0.213	1.35E-15
		TO-ISS-AK-01 T05						14	2.6	0.00051	0.053	4.43E-08	0.266	1.70E-15
		TO-ISS-AK-01 T06						28	2.6	0.00051	0.053	2.21E-08	0.319	8.51E-16
		TO-ISS-AK-01 T07						42	2.6	0.00051	0.053	1.47E-08	0.373	1.44E-15
		TO-ISS-AK-01 T08						49	2.6	0.00051	0.053	1.26E-08	0.426	7.58E-15
		TO-ISS-AK-01 T09						63	2.6	0.00051	0.053	9.79E-09	0.479	2.33E-15
TO-ISS-AK-03	AK	TO-ISS-AK-03 T01	172.3	381	1885	1.798	1440	0.08	2.6	0.00051	0.053	7.70E-06	0.053	2.30E-14
		TO-ISS-AK-03 T02						1	2.6	0.00051	0.053	6.70E-07	0.106	3.57E-15
		TO-ISS-AK-03 T03						2	2.6	0.00051	0.053	3.21E-07	0.160	1.07E-14
		TO-ISS-AK-03 T04						7	2.6	0.00051	0.053	8.90E-08	0.213	1.21E-15
		TO-ISS-AK-03 T05						14	2.6	0.00051	0.053	4.43E-08	0.266	1.53E-15
		TO-ISS-AK-03 T06						28	2.6	0.00051	0.053	2.21E-08	0.319	7.65E-16
		TO-ISS-AK-03 T07						42	2.6	0.00051	0.053	1.47E-08	0.373	1.30E-15
		TO-ISS-AK-03 T08						49	2.6	0.00051	0.053	1.26E-08	0.426	6.81E-15
		TO-ISS-AK-03 T09						63	2.6	0.00051	0.053	9.79E-09	0.479	2.09E-15
TO-ISS-BT-01	BT	TO-ISS-BT-01 T01	172.3	377.8	1917	1.798	1488	0.08	2200	0.00051	0.053	7.70E-06	0.053	3.01E-20
		TO-ISS-BT-01 T02						1	2200	0.00051	0.053	6.70E-07	0.106	4.68E-21
		TO-ISS-BT-01 T03						2	2200	0.00051	0.053	3.21E-07	0.160	1.40E-20
		TO-ISS-BT-01 T04						7	2200	0.00051	0.053	8.90E-08	0.213	1.59E-21
		TO-ISS-BT-01 T05						14	2200	0.00051	0.053	4.43E-08	0.266	2.00E-21
		TO-ISS-BT-01 T06						28	2200	0.00056	0.058	2.42E-08	0.325	1.21E-21
		TO-ISS-BT-01 T07						42	2200	0.0011	0.115	3.17E-08	0.439	7.91E-21
		TO-ISS-BT-01 T08						49	2200	0.00051	0.053	1.26E-08	0.493	8.92E-21
		TO-ISS-BT-01 T09						63	2200	0.00083	0.087	1.59E-08	0.579	7.25E-21
TO-ISS-BT-03	BT	TO-ISS-BT-03 T01	172.3	387.7	1944.646	1.798	1529	0.08	2200	0.00051	0.053	7.70E-06	0.053	2.85E-20
		TO-ISS-BT-03 T02						1	2200	0.00051	0.053	6.70E-07	0.106	4.43E-21
		TO-ISS-BT-03 T03						2	2200	0.00051	0.053	3.21E-07	0.160	1.33E-20
		TO-ISS-BT-03 T04						7	2200	0.00051	0.053	8.90E-08	0.213	1.50E-21
		TO-ISS-BT-03 T05						14	2200	0.00051	0.053	4.43E-08	0.266	1.90E-21
		TO-ISS-BT-03 T06						28	2200	0.00051	0.053	2.21E-08	0.319	9.48E-22
		TO-ISS-BT-03 T07						42	2200	0.00051	0.053	1.47E-08	0.373	1.61E-21
		TO-ISS-BT-03 T08						49	2200	0.00051	0.053	1.26E-08	0.426	8.44E-21
		TO-ISS-BT-03 T09						63	2200	0.00051	0.053	9.79E-09	0.479	2.59E-21

Notes:

1. Based on the dimensions of tested ISS molds
2. Based on reported weight of ISS molds by TestAmerica
3. Bulk density of ISS treated soils
4. Volume of eluate used in leach testing. Provided by TestAmerica
5. Dry density of soil as reported by geotechnical laboratory
6. Total COC concentration of soil as reported by TestAmerica
7. EPA Method 1315 testing analytical results provided by TestAmerica
8. Calculated in accordance with the procedure outlined in EPA Method 1315

cm^3 = cubic centimeters
g = grams
kg/m^3 = kilograms per cubic meter
L = liter
mg/m^2 = milligrams per square meter
mg/kg = milligrams per kilogram
mg/m^2/sec = milligrams per square meter per second
m^2/sec = square meters per second

TABLE 6
ISS Treated Soils Leaching Characteristics (EPA Method 1315)
Time Oil
Seattle, WA

Mix Design ID	Property	Test ID	Leach Testing Parameters						m-Xylene & p-Xylene					
			Surface Area [1]	ISS Mass [2]	Sample Density [3]	Eluate Volume [4]	Soil Dry Density [5]	Time Interval	Total Soil Concentration [6]	Eluate Concentration [7]	Interval Mass Release [8]	Interval Mass Flux [8]	Cumulative Mass Release [8]	Diffusivity [8]
			(cm^2)	(g)	(kg/m^3)	(L)	(kg/m^3)	(days)	(mg/kg)	(mg/L)	(mg/m^2)	(mg/m^2/sec)	(mg/m^2)	(m^2/sec)
TO-ISS-AK-01	Ak	TO-ISS-AK-01 T01	172.3	369.8	1842	1.798	1366	0.08	2.3	0.00048	0.050	7.25E-06	0.050	2.89E-14
		TO-ISS-AK-01 T02						1	2.3	0.00048	0.050	6.30E-07	0.100	4.50E-15
		TO-ISS-AK-01 T03						2	2.3	0.00048	0.050	3.02E-07	0.150	1.35E-14
		TO-ISS-AK-01 T04						7	2.3	0.00048	0.050	8.38E-08	0.200	1.52E-15
		TO-ISS-AK-01 T05						14	2.3	0.00048	0.050	4.17E-08	0.250	1.93E-15
		TO-ISS-AK-01 T06						28	2.3	0.00048	0.050	2.08E-08	0.301	9.63E-16
		TO-ISS-AK-01 T07						42	2.3	0.00048	0.050	1.38E-08	0.351	1.64E-15
		TO-ISS-AK-01 T08						49	2.3	0.00048	0.050	1.19E-08	0.401	8.58E-15
		TO-ISS-AK-01 T09						63	2.3	0.00048	0.050	9.21E-09	0.451	2.63E-15
TO-ISS-AK-03	AK	TO-ISS-AK-03 T01	172.3	381	1885	1.798	1440	0.08	2.3	0.00048	0.050	7.25E-06	0.050	2.60E-14
		TO-ISS-AK-03 T02						1	2.3	0.00048	0.050	6.30E-07	0.100	4.04E-15
		TO-ISS-AK-03 T03						2	2.3	0.00048	0.050	3.02E-07	0.150	1.21E-14
		TO-ISS-AK-03 T04						7	2.3	0.00048	0.050	8.38E-08	0.200	1.37E-15
		TO-ISS-AK-03 T05						14	2.3	0.00048	0.050	4.17E-08	0.250	1.73E-15
		TO-ISS-AK-03 T06						28	2.3	0.00048	0.050	2.08E-08	0.301	8.65E-16
		TO-ISS-AK-03 T07						42	2.3	0.00048	0.050	1.38E-08	0.351	1.47E-15
		TO-ISS-AK-03 T08						49	2.3	0.00048	0.050	1.19E-08	0.401	7.71E-15
		TO-ISS-AK-03 T09						63	2.3	0.00048	0.050	9.21E-09	0.451	2.37E-15
TO-ISS-BT-01	BT	TO-ISS-BT-01 T01	172.3	377.8	1917	1.798	1488	0.08	5300	0.00048	0.050	7.25E-06	0.050	4.59E-21
		TO-ISS-BT-01 T02						1	5300	0.00048	0.050	6.30E-07	0.100	7.14E-22
		TO-ISS-BT-01 T03						2	5300	0.00048	0.050	3.02E-07	0.150	2.14E-21
		TO-ISS-BT-01 T04						7	5300	0.00092	0.096	1.61E-07	0.246	8.89E-22
		TO-ISS-BT-01 T05						14	5300	0.0011	0.115	9.55E-08	0.361	1.60E-21
		TO-ISS-BT-01 T06						28	5300	0.0016	0.167	6.92E-08	0.528	1.70E-21
		TO-ISS-BT-01 T07						42	5300	0.003	0.313	8.64E-08	0.841	1.01E-20
		TO-ISS-BT-01 T08						49	5300	0.0013	0.136	3.21E-08	0.977	9.98E-21
		TO-ISS-BT-01 T09						63	5300	0.0021	0.219	4.03E-08	1.196	8.00E-21
TO-ISS-BT-03	BT	TO-ISS-BT-03 T01	172.3	387.7	1944.646	1.798	1529	0.08	5300	0.00048	0.050	7.25E-06	0.050	4.34E-21
		TO-ISS-BT-03 T02						1	5300	0.00048	0.050	6.30E-07	0.100	6.76E-22
		TO-ISS-BT-03 T03						2	5300	0.00048	0.050	3.02E-07	0.150	2.03E-21
		TO-ISS-BT-03 T04						7	5300	0.00056	0.058	9.78E-08	0.209	3.12E-22
		TO-ISS-BT-03 T05						14	5300	0.00048	0.050	4.17E-08	0.259	2.89E-22
		TO-ISS-BT-03 T06						28	5300	0.00066	0.069	2.86E-08	0.328	2.73E-22
		TO-ISS-BT-03 T07						42	5300	0.00049	0.051	1.41E-08	0.379	2.56E-22
		TO-ISS-BT-03 T08						49	5300	0.00048	0.050	1.19E-08	0.429	1.29E-21
		TO-ISS-BT-03 T09						63	5300	0.00048	0.050	9.21E-09	0.479	3.96E-22

Notes:

1. Based on the dimensions of tested ISS molds
2. Based on reported weight of ISS molds by TestAmerica
3. Bulk density of ISS treated soils
4. Volume of eluate used in leach testing. Provided by TestAmerica
5. Dry density of soil as reported by geotechnical laboratory
6. Total COC concentration of soil as reported by TestAmerica
7. EPA Method 1315 testing analytical results provided by TestAmerica
8. Calculated in accordance with the procedure outlined in EPA Method 1315

cm^3 = cubic centimeters
g = grams
kg/m^3 = kilograms per cubic meter
L = liter
mg/m^2 = milligrams per square meter
mg/kg = milligrams per kilogram
mg/m^2/sec = milligrams per square meter per second
m^2/sec = square meters per second

TABLE 6
ISS Treated Soils Leaching Characteristics (EPA Method 1315)
Time Oil
Seattle, WA

Mix Design ID	Property	Test ID	Leach Testing Parameters						o-Xylene					
			Surface Area [1]	ISS Mass [2]	Sample Density [3]	Eluate Volume [4]	Soil Dry Density [5]	Time Interval	Total Soil Concentration [6]	Eluate Concentration [7]	Interval Mass Release [8]	Interval Mass Flux [8]	Cumulative Mass Release [8]	Diffusivity [8]
			(cm^2)	(g)	(kg/m^3)	(L)	(kg/m^3)	(days)	(mg/kg)	(mg/L)	(mg/m^2)	(mg/m^2/sec)	(mg/m^2)	(m^2/sec)
TO-ISS-AK-01	Ak	TO-ISS-AK-01 T01	172.3	369.8	1842	1.798	1366	0.08	2.9	0.00041	0.043	6.19E-06	0.043	1.33E-14
		TO-ISS-AK-01 T02						1	2.9	0.00041	0.043	5.38E-07	0.086	2.06E-15
		TO-ISS-AK-01 T03						2	2.9	0.00041	0.043	2.58E-07	0.128	6.19E-15
		TO-ISS-AK-01 T04						7	2.9	0.00041	0.043	7.16E-08	0.171	7.00E-16
		TO-ISS-AK-01 T05						14	2.9	0.00041	0.043	3.56E-08	0.214	8.84E-16
		TO-ISS-AK-01 T06						28	2.9	0.00041	0.043	1.77E-08	0.257	4.42E-16
		TO-ISS-AK-01 T07						42	2.9	0.00041	0.043	1.18E-08	0.300	7.50E-16
		TO-ISS-AK-01 T08						49	2.9	0.00041	0.043	1.01E-08	0.342	3.94E-15
		TO-ISS-AK-01 T09						63	2.9	0.00041	0.043	7.87E-09	0.385	1.21E-15
TO-ISS-AK-03	AK	TO-ISS-AK-03 T01	172.3	381	1885	1.798	1440	0.08	2.9	0.00041	0.043	6.19E-06	0.043	1.19E-14
		TO-ISS-AK-03 T02						1	2.9	0.00041	0.043	5.38E-07	0.086	1.85E-15
		TO-ISS-AK-03 T03						2	2.9	0.00041	0.043	2.58E-07	0.128	5.56E-15
		TO-ISS-AK-03 T04						7	2.9	0.00041	0.043	7.16E-08	0.171	6.29E-16
		TO-ISS-AK-03 T05						14	2.9	0.00041	0.043	3.56E-08	0.214	7.94E-16
		TO-ISS-AK-03 T06						28	2.9	0.00041	0.043	1.77E-08	0.257	3.97E-16
		TO-ISS-AK-03 T07						42	2.9	0.00041	0.043	1.18E-08	0.300	6.75E-16
		TO-ISS-AK-03 T08						49	2.9	0.00041	0.043	1.01E-08	0.342	3.54E-15
		TO-ISS-AK-03 T09						63	2.9	0.00041	0.043	7.87E-09	0.385	1.09E-15
TO-ISS-BT-01	BT	TO-ISS-BT-01 T01	172.3	377.8	1917	1.798	1488	0.08	2900	0.00041	0.043	6.19E-06	0.043	1.12E-20
		TO-ISS-BT-01 T02						1	2900	0.00041	0.043	5.38E-07	0.086	1.74E-21
		TO-ISS-BT-01 T03						2	2900	0.00041	0.043	2.58E-07	0.128	5.21E-21
		TO-ISS-BT-01 T04						7	2900	0.0018	0.188	3.14E-07	0.316	1.14E-20
		TO-ISS-BT-01 T05						14	2900	0.0019	0.198	1.65E-07	0.515	1.60E-20
		TO-ISS-BT-01 T06						28	2900	0.0031	0.324	1.34E-07	0.838	2.13E-20
		TO-ISS-BT-01 T07						42	2900	0.006	0.626	1.73E-07	1.464	1.35E-19
		TO-ISS-BT-01 T08						49	2900	0.0019	0.198	4.69E-08	1.663	7.12E-20
		TO-ISS-BT-01 T09						63	2900	0.0045	0.470	8.64E-08	2.132	1.23E-19
TO-ISS-BT-03	BT	TO-ISS-BT-03 T01	172.3	387.7	1944.646	1.798	1529	0.08	2900	0.00041	0.043	6.19E-06	0.043	1.06E-20
		TO-ISS-BT-03 T02						1	2900	0.00041	0.043	5.38E-07	0.086	1.65E-21
		TO-ISS-BT-03 T03						2	2900	0.00041	0.043	2.58E-07	0.128	4.94E-21
		TO-ISS-BT-03 T04						7	2900	0.0013	0.136	2.27E-07	0.264	5.61E-21
		TO-ISS-BT-03 T05						14	2900	0.0011	0.115	9.55E-08	0.379	5.07E-21
		TO-ISS-BT-03 T06						28	2900	0.0014	0.146	6.06E-08	0.525	4.11E-21
		TO-ISS-BT-03 T07						42	2900	0.0012	0.125	3.46E-08	0.650	5.13E-21
		TO-ISS-BT-03 T08						49	2900	0.00073	0.076	1.80E-08	0.726	9.96E-21
		TO-ISS-BT-03 T09						63	2900	0.00099	0.103	1.90E-08	0.830	5.62E-21

Notes:

1. Based on the dimensions of tested ISS molds
2. Based on reported weight of ISS molds by TestAmerica
3. Bulk density of ISS treated soils
4. Volume of eluate used in leach testing. Provided by TestAmerica
5. Dry density of soil as reported by geotechnical laboratory
6. Total COC concentration of soil as reported by TestAmerica
7. EPA Method 1315 testing analytical results provided by TestAmerica
8. Calculated in accordance with the procedure outlined in EPA Method 1315

cm^3 = cubic centimeters
g = grams
kg/m^3 = kilograms per cubic meter
L = liter
mg/m^2 = milligrams per square meter
mg/kg = milligrams per kilogram
mg/m^2/sec = milligrams per square meter per second
m^2/sec = square meters per second

TABLE 6
ISS Treated Soils Leaching Characteristics (EPA Method 1315)
Time Oil
Seattle, WA

Mix Design ID	Property	Test ID	Leach Testing Parameters						Toluene					
			Surface Area [1]	ISS Mass [2]	Sample Density [3]	Eluate Volume [4]	Soil Dry Density [5]	Time Interval	Total Soil Concentration [6]	Eluate Concentration [7]	Interval Mass Release [8]	Interval Mass Flux [8]	Cumulative Mass Release [8]	Diffusivity [8]
			(cm^2)	(g)	(kg/m^3)	(L)	(kg/m^3)	(days)	(mg/kg)	(mg/L)	(mg/m^2)	(mg/m^2/sec)	(mg/m^2)	(m^2/sec)
TO-ISS-AK-01	Ak	TO-ISS-AK-01 T01	172.3	369.8	1842	1.798	1366	0.08	2	0.00046	0.048	6.95E-06	0.048	3.51E-14
		TO-ISS-AK-01 T02						1	2	0.00046	0.048	6.04E-07	0.096	5.46E-15
		TO-ISS-AK-01 T03						2	2	0.00046	0.048	2.89E-07	0.144	1.64E-14
		TO-ISS-AK-01 T04						7	2	0.00046	0.048	8.03E-08	0.192	1.85E-15
		TO-ISS-AK-01 T05						14	2	0.00046	0.048	3.99E-08	0.240	2.34E-15
		TO-ISS-AK-01 T06						28	2	0.00046	0.048	1.99E-08	0.288	1.17E-15
		TO-ISS-AK-01 T07						42	2	0.00046	0.048	1.33E-08	0.336	1.99E-15
		TO-ISS-AK-01 T08						49	2	0.00046	0.048	1.14E-08	0.384	1.04E-14
		TO-ISS-AK-01 T09						63	2	0.00046	0.048	8.83E-09	0.432	3.20E-15
TO-ISS-AK-03	AK	TO-ISS-AK-03 T01	172.3	381	1885	1.798	1440	0.08	2	0.00046	0.048	6.95E-06	0.048	3.16E-14
		TO-ISS-AK-03 T02						1	2	0.00046	0.048	6.04E-07	0.096	4.91E-15
		TO-ISS-AK-03 T03						2	2	0.00046	0.048	2.89E-07	0.144	1.47E-14
		TO-ISS-AK-03 T04						7	2	0.00046	0.048	8.03E-08	0.192	1.66E-15
		TO-ISS-AK-03 T05						14	2	0.00046	0.048	3.99E-08	0.240	2.10E-15
		TO-ISS-AK-03 T06						28	2	0.00046	0.048	1.99E-08	0.288	1.05E-15
		TO-ISS-AK-03 T07						42	2	0.00046	0.048	1.33E-08	0.336	1.79E-15
		TO-ISS-AK-03 T08						49	2	0.00046	0.048	1.14E-08	0.384	9.36E-15
		TO-ISS-AK-03 T09						63	2	0.00046	0.048	8.83E-09	0.432	2.87E-15
TO-ISS-BT-01	BT	TO-ISS-BT-01 T01	172.3	377.8	1917	1.798	1488	0.08	530	0.00046	0.048	6.95E-06	0.048	4.21E-19
		TO-ISS-BT-01 T02						1	530	0.00046	0.048	6.04E-07	0.096	6.55E-20
		TO-ISS-BT-01 T03						2	530	0.00046	0.048	2.89E-07	0.144	1.96E-19
		TO-ISS-BT-01 T04						7	530	0.00046	0.048	8.03E-08	0.192	2.22E-20
		TO-ISS-BT-01 T05						14	530	0.00046	0.048	3.99E-08	0.240	2.81E-20
		TO-ISS-BT-01 T06						28	530	0.00046	0.048	1.99E-08	0.288	1.40E-20
		TO-ISS-BT-01 T07						42	530	0.00046	0.048	1.33E-08	0.336	2.38E-20
		TO-ISS-BT-01 T08						49	530	0.00046	0.048	1.14E-08	0.384	1.25E-19
		TO-ISS-BT-01 T09						63	530	0.00046	0.048	8.83E-09	0.432	3.84E-20
TO-ISS-BT-03	BT	TO-ISS-BT-03 T01	172.3	387.7	1944.646	1.798	1529	0.08	530	0.00046	0.048	6.95E-06	0.048	3.99E-19
		TO-ISS-BT-03 T02						1	530	0.00046	0.048	6.04E-07	0.096	6.20E-20
		TO-ISS-BT-03 T03						2	530	0.00046	0.048	2.89E-07	0.144	1.86E-19
		TO-ISS-BT-03 T04						7	530	0.00046	0.048	8.03E-08	0.192	2.10E-20
		TO-ISS-BT-03 T05						14	530	0.00046	0.048	3.99E-08	0.240	2.66E-20
		TO-ISS-BT-03 T06						28	530	0.00046	0.048	1.99E-08	0.288	1.33E-20
		TO-ISS-BT-03 T07						42	530	0.00046	0.048	1.33E-08	0.336	2.26E-20
		TO-ISS-BT-03 T08						49	530	0.00046	0.048	1.14E-08	0.384	1.18E-19
		TO-ISS-BT-03 T09						63	530	0.00046	0.048	8.83E-09	0.432	3.63E-20

Notes:

1. Based on the dimensions of tested ISS molds
2. Based on reported weight of ISS molds by TestAmerica
3. Bulk density of ISS treated soils
4. Volume of eluate used in leach testing. Provided by TestAmerica
5. Dry density of soil as reported by geotechnical laboratory
6. Total COC concentration of soil as reported by TestAmerica
7. EPA Method 1315 testing analytical results provided by TestAmerica
8. Calculated in accordance with the procedure outlined in EPA Method 1315

cm^3 = cubic centimeters
g = grams
kg/m^3 = kilograms per cubic meter
L = liter
mg/m^2 = milligrams per square meter
mg/kg = milligrams per kilogram
mg/m^2/sec = milligrams per square meter per second
m^2/sec = square meters per second

TABLE 6
ISS Treated Soils Leaching Characteristics (EPA Method 1315)
Time Oil
Seattle, WA

Mix Design ID	Property	Test ID	Leach Testing Parameters						Trichloroethene					
			Surface Area [1]	ISS Mass [2]	Sample Density [3]	Eluate Volume [4]	Soil Dry Density [5]	Time Interval	Total Soil Concentration [6]	Eluate Concentration [7]	Interval Mass Release [8]	Interval Mass Flux [8]	Cumulative Mass Release [8]	Diffusivity [8]
			(cm^2)	(g)	(kg/m^3)	(L)	(kg/m^3)	(days)	(mg/kg)	(mg/L)	(mg/m^2)	(mg/m^2/sec)	(mg/m^2)	(m^2/sec)
TO-ISS-AK-01	Ak	TO-ISS-AK-01 T01	172.3	369.8	1842	1.798	1366	0.08	150	0.00069	0.072	1.04E-05	0.072	1.40E-17
		TO-ISS-AK-01 T02						1	150	0.0007	0.073	9.19E-07	0.145	2.25E-18
		TO-ISS-AK-01 T03						2	150	0.0014	0.146	8.81E-07	0.291	2.70E-17
		TO-ISS-AK-01 T04						7	150	0.0063	0.657	1.10E-06	0.949	6.18E-17
		TO-ISS-AK-01 T05						14	150	0.0095	0.991	8.24E-07	1.940	1.77E-16
		TO-ISS-AK-01 T06						28	150	0.028	2.922	1.21E-06	4.862	7.70E-16
		TO-ISS-AK-01 T07						42	150	0.033	3.444	9.51E-07	8.306	1.82E-15
		TO-ISS-AK-01 T08						49	150	0.012	1.252	2.96E-07	9.559	1.26E-15
		TO-ISS-AK-01 T09						63	150	0.019	1.983	3.65E-07	11.542	9.70E-16
TO-ISS-AK-03	AK	TO-ISS-AK-03 T01	172.3	381	1885	1.798	1440	0.08	150	0.00069	0.072	1.04E-05	0.072	1.26E-17
		TO-ISS-AK-03 T02						1	150	0.001	0.104	1.31E-06	0.176	4.12E-18
		TO-ISS-AK-03 T03						2	150	0.0012	0.125	7.55E-07	0.302	1.78E-17
		TO-ISS-AK-03 T04						7	150	0.0084	0.877	1.47E-06	1.178	9.87E-17
		TO-ISS-AK-03 T05						14	150	0.0076	0.793	6.59E-07	1.971	1.02E-16
		TO-ISS-AK-03 T06						28	150	0.015	1.565	6.49E-07	3.537	1.99E-16
		TO-ISS-AK-03 T07						42	150	0.02	2.087	5.76E-07	5.624	6.00E-16
		TO-ISS-AK-03 T08						49	150	0.0092	0.960	2.27E-07	6.584	6.66E-16
		TO-ISS-AK-03 T09						63	150	0.011	1.148	2.11E-07	7.732	2.92E-16
TO-ISS-BT-01	BT	TO-ISS-BT-01 T01	172.3	377.8	1917	1.798	1488	0.08	80	0.00069	0.072	1.04E-05	0.072	4.16E-17
		TO-ISS-BT-01 T02						1	80	0.00069	0.072	9.06E-07	0.144	6.47E-18
		TO-ISS-BT-01 T03						2	80	0.00069	0.072	4.34E-07	0.216	1.94E-17
		TO-ISS-BT-01 T04						7	80	0.00069	0.072	1.20E-07	0.288	2.19E-18
		TO-ISS-BT-01 T05						14	80	0.00069	0.072	5.99E-08	0.360	2.77E-18
		TO-ISS-BT-01 T06						28	80	0.00069	0.072	2.99E-08	0.432	1.39E-18
		TO-ISS-BT-01 T07						42	80	0.00069	0.072	1.99E-08	0.504	2.35E-18
		TO-ISS-BT-01 T08						49	80	0.00069	0.072	1.70E-08	0.576	1.23E-17
		TO-ISS-BT-01 T09						63	80	0.00069	0.072	1.32E-08	0.648	3.79E-18
TO-ISS-BT-03	BT	TO-ISS-BT-03 T01	172.3	387.7	1944.646	1.798	1529	0.08	80	0.00069	0.072	1.04E-05	0.072	3.94E-17
		TO-ISS-BT-03 T02						1	80	0.00069	0.072	9.06E-07	0.144	6.13E-18
		TO-ISS-BT-03 T03						2	80	0.00069	0.072	4.34E-07	0.216	1.84E-17
		TO-ISS-BT-03 T04						7	80	0.00069	0.072	1.20E-07	0.288	2.08E-18
		TO-ISS-BT-03 T05						14	80	0.00069	0.072	5.99E-08	0.360	2.62E-18
		TO-ISS-BT-03 T06						28	80	0.00069	0.072	2.99E-08	0.432	1.31E-18
		TO-ISS-BT-03 T07						42	80	0.00069	0.072	1.99E-08	0.504	2.23E-18
		TO-ISS-BT-03 T08						49	80	0.00069	0.072	1.70E-08	0.576	1.17E-17
		TO-ISS-BT-03 T09						63	80	0.00069	0.072	1.32E-08	0.648	3.59E-18

Notes:

1. Based on the dimensions of tested ISS molds
2. Based on reported weight of ISS molds by TestAmerica
3. Bulk density of ISS treated soils
4. Volume of eluate used in leach testing. Provided by TestAmerica
5. Dry density of soil as reported by geotechnical laboratory
6. Total COC concentration of soil as reported by TestAmerica
7. EPA Method 1315 testing analytical results provided by TestAmerica
8. Calculated in accordance with the procedure outlined in EPA Method 1315

cm^3 = cubic centimeters
g = grams
kg/m^3 = kilograms per cubic meter
L = liter
mg/m^2 = milligrams per square meter
mg/kg = milligrams per kilogram
mg/m^2/sec = milligrams per square meter per second
m^2/sec = square meters per second

TABLE 6
ISS Treated Soils Leaching Characteristics (EPA Method 1315)
Time Oil
Seattle, WA

Mix Design ID	Property	Test ID	Leach Testing Parameters						Xylenes, Total					
			Surface Area [1]	ISS Mass [2]	Sample Density [3]	Eluate Volume [4]	Soil Dry Density [5]	Time Interval	Total Soil Concentration [6]	Eluate Concentration [7]	Interval Mass Release [8]	Interval Mass Flux [8]	Cumulative Mass Release [8]	Diffusivity [8]
			(cm^2)	(g)	(kg/m^3)	(L)	(kg/m^3)	(days)	(mg/kg)	(mg/L)	(mg/m^2)	(mg/m^2/sec)	(mg/m^2)	(m^2/sec)
TO-ISS-AK-01	Ak	TO-ISS-AK-01 T01	172.3	369.8	1842	1.798	1366	0.08	5.2	0.00089	0.093	1.34E-05	0.093	1.94E-14
		TO-ISS-AK-01 T02						1	5.2	0.00089	0.093	1.17E-06	0.186	3.02E-15
		TO-ISS-AK-01 T03						2	5.2	0.00089	0.093	5.60E-07	0.279	9.07E-15
		TO-ISS-AK-01 T04						7	5.2	0.00089	0.093	1.55E-07	0.372	1.03E-15
		TO-ISS-AK-01 T05						14	5.2	0.00089	0.093	7.72E-08	0.464	1.30E-15
		TO-ISS-AK-01 T06						28	5.2	0.00089	0.093	3.85E-08	0.557	6.48E-16
		TO-ISS-AK-01 T07						42	5.2	0.00089	0.093	2.56E-08	0.650	1.10E-15
		TO-ISS-AK-01 T08						49	5.2	0.00089	0.093	2.20E-08	0.743	5.77E-15
		TO-ISS-AK-01 T09						63	5.2	0.00089	0.093	1.71E-08	0.836	1.77E-15
TO-ISS-AK-03	AK	TO-ISS-AK-03 T01	172.3	381	1885	1.798	1440	0.08	5.2	0.00089	0.093	1.34E-05	0.093	1.75E-14
		TO-ISS-AK-03 T02						1	5.2	0.00089	0.093	1.17E-06	0.186	2.72E-15
		TO-ISS-AK-03 T03						2	5.2	0.00089	0.093	5.60E-07	0.279	8.15E-15
		TO-ISS-AK-03 T04						7	5.2	0.00089	0.093	1.55E-07	0.372	9.22E-16
		TO-ISS-AK-03 T05						14	5.2	0.00089	0.093	7.72E-08	0.464	1.16E-15
		TO-ISS-AK-03 T06						28	5.2	0.00089	0.093	3.85E-08	0.557	5.82E-16
		TO-ISS-AK-03 T07						42	5.2	0.00089	0.093	2.56E-08	0.650	9.89E-16
		TO-ISS-AK-03 T08						49	5.2	0.00089	0.093	2.20E-08	0.743	5.19E-15
		TO-ISS-AK-03 T09						63	5.2	0.00089	0.093	1.71E-08	0.836	1.59E-15
TO-ISS-BT-01	BT	TO-ISS-BT-01 T01	172.3	377.8	1917	1.798	1488	0.08	8100	0.00089	0.093	1.34E-05	0.093	6.75E-21
		TO-ISS-BT-01 T02						1	8100	0.00089	0.093	1.17E-06	0.186	1.05E-21
		TO-ISS-BT-01 T03						2	8100	0.00089	0.093	5.60E-07	0.279	3.15E-21
		TO-ISS-BT-01 T04						7	8100	0.0028	0.292	4.89E-07	0.571	3.53E-21
		TO-ISS-BT-01 T05						14	8100	0.0029	0.303	2.52E-07	0.874	4.78E-21
		TO-ISS-BT-01 T06						28	8100	0.0047	0.491	2.03E-07	1.364	6.27E-21
		TO-ISS-BT-01 T07						42	8100	0.009	0.939	2.59E-07	2.303	3.91E-20
		TO-ISS-BT-01 T08						49	8100	0.0032	0.334	7.90E-08	2.637	2.59E-20
		TO-ISS-BT-01 T09						63	8100	0.0066	0.689	1.27E-07	3.326	3.38E-20
TO-ISS-BT-03	BT	TO-ISS-BT-03 T01	172.3	387.7	1944.646	1.798	1529	0.08	8100	0.00089	0.093	1.34E-05	0.093	6.39E-21
		TO-ISS-BT-03 T02						1	8100	0.00089	0.093	1.17E-06	0.186	9.94E-22
		TO-ISS-BT-03 T03						2	8100	0.00089	0.093	5.60E-07	0.279	2.98E-21
		TO-ISS-BT-03 T04						7	8100	0.0019	0.198	3.32E-07	0.477	1.54E-21
		TO-ISS-BT-03 T05						14	8100	0.0011	0.115	9.55E-08	0.592	6.50E-22
		TO-ISS-BT-03 T06						28	8100	0.0021	0.219	9.09E-08	0.811	1.19E-21
		TO-ISS-BT-03 T07						42	8100	0.0017	0.177	4.90E-08	0.988	1.32E-21
		TO-ISS-BT-03 T08						49	8100	0.0011	0.115	2.72E-08	1.103	2.90E-21
		TO-ISS-BT-03 T09						63	8100	0.00099	0.103	1.90E-08	1.206	7.20E-22

Notes:

1. Based on the dimensions of tested ISS molds
2. Based on reported weight of ISS molds by TestAmerica
3. Bulk density of ISS treated soils
4. Volume of eluate used in leach testing. Provided by TestAmerica
5. Dry density of soil as reported by geotechnical laboratory
6. Total COC concentration of soil as reported by TestAmerica
7. EPA Method 1315 testing analytical results provided by TestAmerica
8. Calculated in accordance with the procedure outlined in EPA Method 1315

cm^3 = cubic centimeters
g = grams
kg/m^3 = kilograms per cubic meter
L = liter
mg/m^2 = milligrams per square meter
mg/kg = milligrams per kilogram
mg/m^2/sec = milligrams per square meter per second
m^2/sec = square meters per second

TABLE 7
ISS Treated Soils - Percent Reduction in Leaching
Time Oil
Seattle, WA

Source Area	Sample ID	Gasoline Range Organics [C6 - C10]	Diesel Range Organics [C10-C34]	Benzene	cis-1,2-Dichloroethene	Ethylbenzene	m-Xylene & p-Xylene	o-Xylene	Toluene	Trichloroethene	Xylenes, Total
Mass Release from Untreated Soil (mg/m2) - EPA Method 1316 [1]											
AK	TO-CS-AK-01	1,405	13,335	ND	ND (All)	ND (All)	ND (All)	ND	ND (All)	7,752	ND
BT (Area Area A)	TO-CS-BT-01	5,529	29,204					1,785		ND	1,785
BT (Area Area B)	TO-CS-BT-01	4,463	24,609					1,099		ND	1,099
Mass Release from ISS Treated Soil (mg/m2) - EPA Method 1315 [2]											
AK	TO-ISS-AK-01	46.755	208.729	0.376	0.445	0.319	0.301	0.385	0.288	11.542	0.836
	TO-ISS-AK-03	46.025	196.206	0.376	0.445	0.319	0.301	0.385	0.288	7.732	0.836
BT	TO-ISS-BT-01	72.325	418.502	0.376	0.445	0.325	0.528	2.132	0.288	0.648	3.326
	TO-ISS-BT-03	49.469	248.388	0.376	0.445	0.319	0.328	0.830	0.288	0.648	1.206
Percent Reduction Leaching in Post-ISS Conditions (%) [3]											
AK	TO-ISS-AK-01	96.7%	98.4%	--	--	--	--	--	--	99.9%	--
AK	TO-ISS-AK-03	96.7%	98.5%	--	--	--	--	--	--	99.9%	--
BT (Area A)	TO-ISS-BT-01	98.7%	98.6%	--	--	--	--	99.9%	--	--	99.8%
BT (Area B)		98.4%	98.3%	--	--	--	--	99.8%	--	--	99.7%
BT (Area A)	TO-ISS-BT-03	99.1%	99.1%	--	--	--	--	100.0%	--	--	99.9%
BT (Area B)		98.9%	99.0%	--	--	--	--	99.9%	--	--	99.9%

Notes:

1. Interpolated mass release per unit area from untreated soils (based EPA Method 1316) at 63 days
2. Calculated cumulative mass release from ISS treated soils (based on EPA Method 1315M) at 63 days (see Table 6)
3. Calculated based on the ratio of reported cumulative mass releases from ISS treated and untreated soils

mg/m^2 = milligrams per square meter

Legend

- Parcel Boundaries
- ISS Soil Borings

N

0 100 Feet

ISS Treatability Study Boring Locations

Time Oil
Seattle, WA

Geosyntec consultants

Mequon, WI | August 2019

Figure 1

Appendix A
Geotechnical Lab Reports

TIMELY
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TESTS, LLC

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	EB
Date	03/20/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Bulk/Composite
Sample ID	30168/Composite AK	Depth/Elev.	-
Location	ASKO	Add. Info	TSB-01/02

ASTM D2974, Standard Test Method for Organic Matter Determination (Method C)

Remarks

Material was dried in the oven at 110+/-5°C prior to ignition.

Organic Matter Determination

Mass of Oven-dried Sample and Dish, g	262.97
Mass of Ashed Sample and Dish, g	262.14
Mass of Dish, g	176.81
Ash Content, %	99.0
Organic Matter, %	1.0

Notes: 1. Muffle furnace temperature used for ash and organic matter content determination was 440°C

Description

Gray Sandy Silt

USCS

ML

TIMELY
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Tested By	EB
Date	03/20/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Bulk/Composite
Sample ID	30168/Composite AK	Depth/Elev.	-
Location	ASKO	Add. Info	TSB-01/02

ASTM G51

Standard Test Method for Determining pH of Soil for Use in Corrosion Testing

SAMPLE PREPARATION

Roots, Stones, Gravel and other deleterious material (>3/8") was removed prior to testing

Measurements performed directly in material at room temperature condition: 20.5 °C

TEST DATA

T.E.S.T. Sample ID	Client Sample ID	pH meter Reading #1	pH meter Reading #2	pH meter Reading #3	**Reported pH value**
30168	AK	7.16	7.17	7.16	**7.2**

REMARKS

NIST TRACEABLE BUFFER SOLUTIONS (4.0; 7.0; 10.0 pH) were used for CALIBRATION of pH METER prior to testing.

pH Meter ID 375/732/733

TIMELY ENGINEERING SOIL TESTS, LLC
1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	EB
Date	03/19/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Bulk/Composite
Sample ID	30168/Composite AK	Depth/Elev.	-
Location	ASKO	Add. Info	TSB-01/02

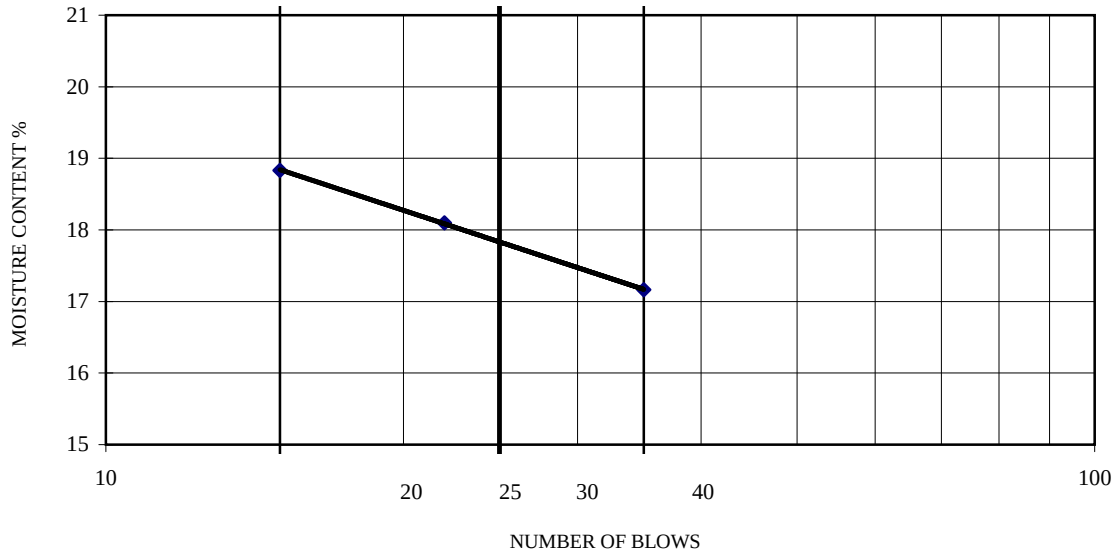
ASTM D 4318/AASHTO T 88, T 89

Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)

LIQUID LIMIT

Number of Blows	35	22	15
Mass of Wet Sample & Tare, g	42.50	45.16	45.74
Mass of Dry Sample & Tare, g	39.96	41.73	42.48
Mass of Tare, g	25.16	22.78	25.17
Moisture Content, %	17.16	18.10	18.83

Oven ID #	15/496/610
Balance ID #	139/563
Liquid Limit Device ID #	451/569



PLASTIC LIMIT

Mass of Wet Sample & Tare, g	37.46	37.24
Mass of Dry Sample & Tare, g	35.62	35.56
Mass of Tare, g	24.91	25.77
Moisture Content, %	17.18	17.16

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

Mass of Wet Sample & Tare, g	1387.50
Mass of Dry Sample & Tare, g	1225.00
Mass of Tare, g	333.50
Moisture Content, %	18.23

LIQUID LIMIT (LL)	18
PLASTIC LIMIT (PL)	17
PLASTICITY INDEX (PI)	1
LIQUIDITY INDEX (LI)	1.23

DESCRIPTION: Gray Sandy Silt

USCS (ASTM D2487; D2488): ML

AASHTO (M 145): NA

TIMELY ENGINEERING SOIL TESTS, LLC

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Phone: 770-938-8233

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Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	RI
Date	03/19/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Bulk/Composite
Sample ID	30168/Composite AK	Depth/Elev.	-
Location	ASKO	Add. Info	TSB-01/02

ASTM D 6913 (D 422 old version), D 1140, C 136, C 117 / AASHTO T 88, T 27, T 11, T 311; Particle Size Analysis (Split Sieve)

MOISTURE CONTENT of TOTAL SAMPLE

Mass of Wet Sample & Tare, g	1387.5
Mass of Dry Sample & Tare, g	1225.0
Mass of Tare, g	333.5
Moisture Content, %	18.2

MOISTURE CONTENT of FINE MATERIAL

Mass of Wet Sample & Tare, g	562.20
Mass of Dry Sample & Tare, g	487.80
Mass of Tare, g	100.80
Moisture Content, %	19.2

TOTAL Mass of wet sample before splitting & tare, g	55440.0
Mass of Tare, g	0.0
TOTAL Mass of dry sample, g	46892.6

Mass of Wet Fine Material & Tare, g	300.40
Mass of Tare, g	0.00
Mass of Dry Fine Material, g	251.96
% of Total Sample Passing Split Sieve	99.2

SIEVE ANALYSIS*

COARSE MATERIAL

Mass of Tare, g: 0.0

Sieve Size		Sample & Tare, g	% RETAINED	% PASSING
12"	COBBLES		0.0	100.0
3"			0.0	100.0
2.5"	COARSE		0.0	100.0
2"	GRAVEL		0.0	100.0
1.5"			0.0	100.0
1"		155.7	0.3	99.7
.75"		171.3	0.4	99.6
.5"	FINE GRAVEL	323.1	0.7	99.3
.375"		364.2	0.8	99.2

FINE MATERIAL

Mass of Tare, g: 0.00

Sieve Size		Cumulative Mass retained, g	% PASSING (of Total)
#4	COARSE SAND	1.03	98.8
#10	MEDIUM	2.16	98.4
#20	SAND	3.25	97.9
#40		6.60	96.6
#60	FINE SAND	29.42	87.6
#100		73.48	70.3
#200	FINES	110.44	55.7

* - ASTM Definitions of Classification

** - AASHTO Definitions of Classification

NOTE: 3/8" (9.5 mm) Sieve used for splitting sample on fine and coarse material

Oven ID #	15/496/610
Balance ID#	139/142/700
Sieve Shaker ID #	555

PARTICLE-SIZE ANALYSIS*

% COBBLES	0.0	% MEDIUM Sand	1.7
% COARSE Gravel	0.4	% FINE Sand	40.9
% FINE Gravel	0.8	% FINES	55.7
% COARSE Sand	0.4	% TOTAL SAMPLE	100.0

REMARKS

PARTICLE-SIZE ANALYSIS**

% COBBLES	0.0	% COARSE Sand	1.7
% COARSE Gravel (Stone)	0.3	% FINE Sand	40.9
% MEDIUM Gravel (Stone)	0.4	% FINES (Silt-Clay)	55.7
% FINE Gravel (Stone)	0.9	% TOTAL SAMPLE	100.0

DESCRIPTION: Gray Sandy Silt

USCS (ASTM D2487; D2488): ML

AASHTO (M 145): NA

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Web: www.test-llc.com

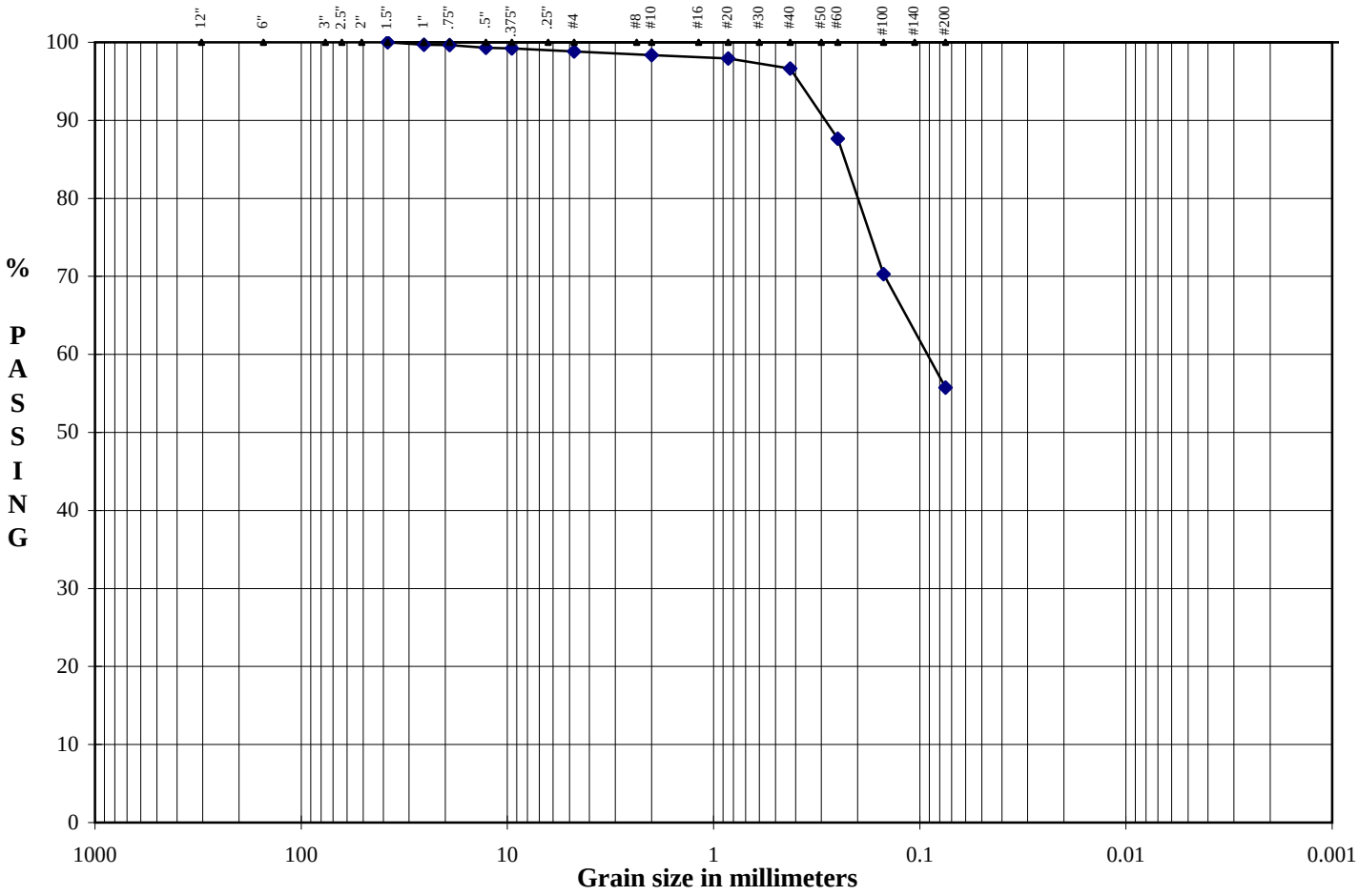
AASHTO ACCREDITED

Tested By	RI
Date	03/19/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Bulk/Composite
Sample ID	30168/Composite AK	Depth/Elev.	-
Location	ASKO	Add. Info	TSB-01/02

ASTM D 6913 (D 422 old version), D 1140, C 136, C 117 / AASHTO T 88, T 27, T 11, T 311
Standard Test Method for Particle-Size Analysis of Soils and Aggregates (Split Sieve)

Particle-Size Analysis



Boulders	Cobbles	Gravel: Coarse	Gravel: Fine	Sand: Coarse	Sand: Medium	Sand: Fine	Fines: Silt or Clay

D_{10}	NA	mm
D_{30}	NA	mm
D_{60}	NA	mm
Cu	NA	
Cc	NA	
Project's Specific % Passing		NA
Project's Specific Particle Size, mm		NA

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Tested By	RI
Date	03/19/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Bulk/Composite
Sample ID	30168/Composite AK	Depth/Elev.	-
Location	ASKO	Add. Info	TSB-01/02

ASTM D 698
Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600kN-m/m^3))

DETERMINATION OF TEST PROCEDURE

	wet	dry
Mass of Soil before sieving, g	55440.0	46892.6
Mass of Mat. Retained on No. 4 sieve, g		
Mass of Mat. Retained on 3/8" sieve, g	364.9	364.9
Mass of Mat. Retained on 3/4" sieve, g		

Material Retained on No. 4 Sieve, %	
Material Retained on 3/8" Sieve, %	0.8
Material Retained on 3/4" Sieve, %	
Total, % (oversized)	0.8

MOISTURE CONTENT

	Coarse + Fine Fraction	Coarse Fraction
Mass of Wet Sample & Tare, g	1387.5	364.9
Mass of Dry Sample & Tare, g	1225.0	364.9
Mass of Tare, g	333.5	0.0
Moisture Content, %	18.2	0.0

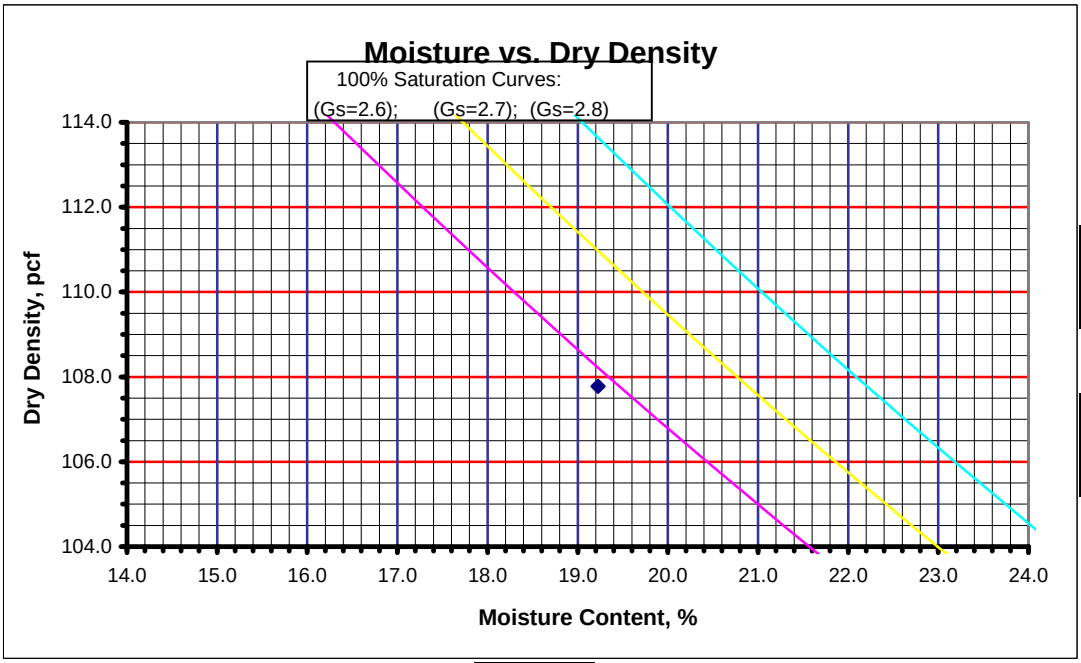
Procedure: B

TEST DATA

Points	1	2	3	4	5
Mass of Mold and Soil, g	6133.0				
Mass of Wet Sample & Tare, g	562.2				
Mass of Dry Sample & Tare, g	487.8				
Mass of Tare, g	100.8				
Moisture Content, %	19.2				
Wet Density, pcf	128.5				
Dry Density, pcf	107.8				

Mold ID Number	314
Mass of Mold, g	4192.0
Volume of Mold, ft^3	0.0333
Hammer ID Number	318
Number of Blows per layer	25
Number of Layers	3

Method A: Material retained on No. 4 Sieve≤ 25%
Method B: Material retained on 3/8" Sieve ≤ 25%
Method C: Material retained on 3/4" Sieve ≤ 30%



REMARKS
One Point Proctor was performed at as-received moisture content.

DESCRIPTION
Gray Sandy Silt

USCS (ASTM D2487; D2488): ML

AASHTO M145: NA

Maximum Dry Density, pcf		**Corrected Maximum Dry Density, pcf**	**NA**
Optimum Moisture Content, %		**Corrected Optimum Moisture Content, %**	**NA**

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Fax: 770-923-8973
Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	EB
Date	03/20/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Bulk/Composite
Sample ID	30170/Composite BT	Depth/Elev.	-
Location	BT	Add. Info	TSB-03/04

ASTM D2974, Standard Test Method for Organic Matter Determination (Method C)

Remarks

Material was dried in the oven at 110+/-5°C prior to ignition.

Organic Matter Determination

Mass of Oven-dried Sample and Dish, g	211.77
Mass of Ashed Sample and Dish, g	211.02
Mass of Dish, g	112.68
Ash Content, %	99.2
Organic Matter, %	0.8

Notes: 1. Muffle furnace temperature used for ash and organic matter content determination was 440°C

Description

Gray Silty Sand

USCS

SM

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Web: www.test-llc.com

Tested By	EB
Date	03/20/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Bulk/Composite
Sample ID	30170/Composite BT	Depth/Elev.	-
Location	BT	Add. Info	TSB-03/04

ASTM G51

Standard Test Method for Determining pH of Soil for Use in Corrosion Testing

SAMPLE PREPARATION

Roots, Stones, Gravel and other deleterious material (>3/8") was removed prior to testing

Measurements performed directly in material at room temperature condition: 20.5 °C

TEST DATA

T.E.S.T. Sample ID	Client Sample ID	pH meter Reading #1	pH meter Reading #2	pH meter Reading #3	**Reported pH value**
30170	BT	8.03	8.04	8.03	**8.0**

REMARKS

NIST TRACEABLE BUFFER SOLUTIONS (4.0; 7.0; 10.0 pH) were used for CALIBRATION of pH METER prior to testing.

pH Meter ID 375/732/733

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Fax: 770-923-8973
Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	EB
Date	03/19/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Bulk/Composite
Sample ID	30170/Composite BT	Depth/Elev.	-
Location	BT	Add. Info	TSB-03/04

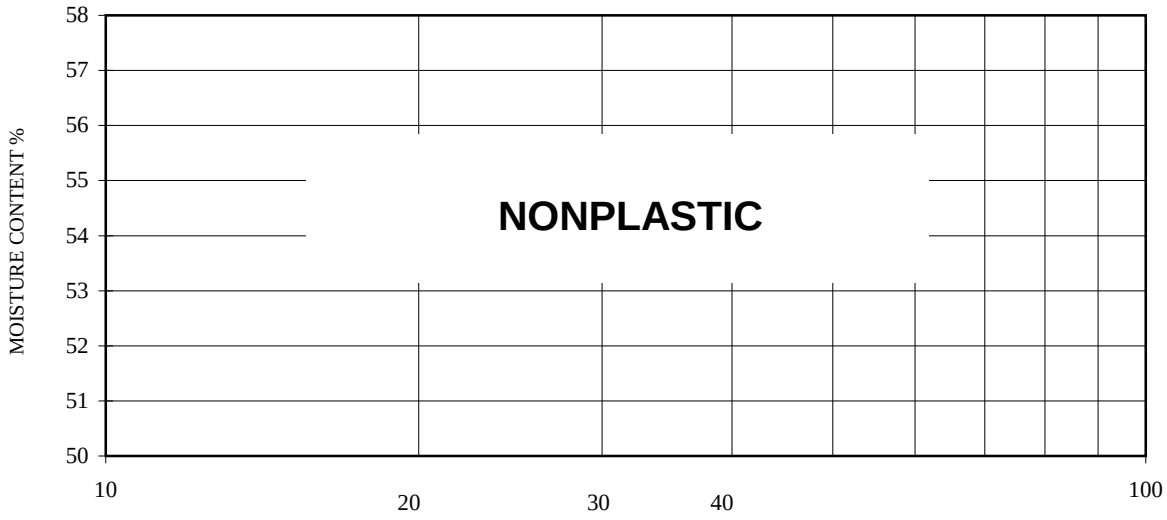
ASTM D 4318

Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)

LIQUID LIMIT		
Number of Blows	7	7
Weight of Wet Sample & Tare, g	46.42	42.98
Weight of Dry Soil & Tare, g	43.50	40.42
Weight of Tare, g	25.12	23.90
Moisture Content, %	15.89	15.50

Liquid Limit Device ID # 56

NOTES: 1. Material appears to be Nonplastic. (Liquid Limit or Plastic Limit test could not be performed.)
2. Material passing No. 40 sieve was used for test.



PLASTIC LIMIT		
Weight of Wet Soil & Tare, g	51.74	44.42
Weight of Dry Soil & Tare, g	48.53	42.18
Weight of Tare, g	25.10	25.31
Moisture Content, %	13.70	13.28

Oven ID Number	15/496/610
Balance ID Number	139/563

NATURAL MOISTURE	
Weight of Wet Soil & Tare, g	1798.50
Weight of Dry Soil & Tare, g	1555.70
Weight of Tare, g	336.00
Moisture Content, %	19.91

LIQUID LIMIT (LL)	NP
PLASTIC LIMIT (PL)	NP
PLASTICITY INDEX (PI)	NP
LIQUIDITY INDEX (LI)	-

DESCRIPTION: Gray Silty Sand

USCS (ASTM D2487;2488): SM

AASHTO (M 145): NA

TIMELY ENGINEERING SOIL TESTS, LLC

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Fax: 770-923-8973

Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	RI
Date	03/19/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Bulk/Composite
Sample ID	30170/Composite BT	Depth/Elev.	-
Location	BT	Add. Info	TSB-03/04

ASTM D 6913 (D 422 old version), D 1140, C 136, C 117 / AASHTO T 88, T 27, T 11, T 311; Particle Size Analysis (Split Sieve)

MOISTURE CONTENT of TOTAL SAMPLE

Mass of Wet Sample & Tare, g	1798.5
Mass of Dry Sample & Tare, g	1555.7
Mass of Tare, g	336.0
Moisture Content, %	19.9

MOISTURE CONTENT of FINE MATERIAL

Mass of Wet Sample & Tare, g	516.50
Mass of Dry Sample & Tare, g	451.50
Mass of Tare, g	95.10
Moisture Content, %	18.2

TOTAL Mass of wet sample before splitting & tare, g	65100.0
Mass of Tare, g	0.0
TOTAL Mass of dry sample, g	54292.3

Mass of Wet Fine Material & Tare, g	300.20
Mass of Tare, g	0.00
Mass of Dry Fine Material, g	253.89
% of Total Sample Passing Split Sieve	95.1

SIEVE ANALYSIS*

COARSE MATERIAL

Mass of Tare, g: 0.0

Sieve Size		Sample & Tare, g	% RETAINED	% PASSING
12"	COBBLES		0.0	100.0
3"			0.0	100.0
2.5"	COARSE		0.0	100.0
2"	GRAVEL		0.0	100.0
1.5"			0.0	100.0
1"		398.2	0.7	99.3
.75"		1285.0	2.4	97.6
.5"	FINE GRAVEL	2200.7	4.1	95.9
.375"		2663.4	4.9	95.1

FINE MATERIAL

Mass of Tare, g: 0.00

Sieve Size		Cumulative Mass retained, g	% PASSING (of Total)
#4	COARSE SAND	7.12	92.4
#10	MEDIUM	13.20	90.2
#20	SAND	17.02	88.7
#40		25.61	85.5
#60	FINE SAND	72.93	67.8
#100		145.76	40.5
#200	FINES	187.60	24.8

* - ASTM Definitions of Classification
** - AASHTO Definitions of Classification

NOTE: 3/8" (9.5 mm) Sieve used for splitting sample on fine and coarse material

Oven ID #	15/496/610
Balance ID#	139/142/700
Sieve Shaker ID #	555

PARTICLE-SIZE ANALYSIS*

% COBBLES	0.0	% MEDIUM Sand	4.6
% COARSE Gravel	2.4	% FINE Sand	60.7
% FINE Gravel	5.2	% FINES	24.8
% COARSE Sand	2.3	% TOTAL SAMPLE	100.0

REMARKS

PARTICLE-SIZE ANALYSIS**

% COBBLES	0.0	% COARSE Sand	4.6
% COARSE Gravel (Stone)	0.7	% FINE Sand	60.7
% MEDIUM Gravel (Stone)	4.2	% FINES (Silt-Clay)	24.8
% FINE Gravel (Stone)	4.9	% TOTAL SAMPLE	100.0

DESCRIPTION: Gray Silty Sand

USCS (ASTM D2487; D2488): SM

AASHTO (M 145): NA

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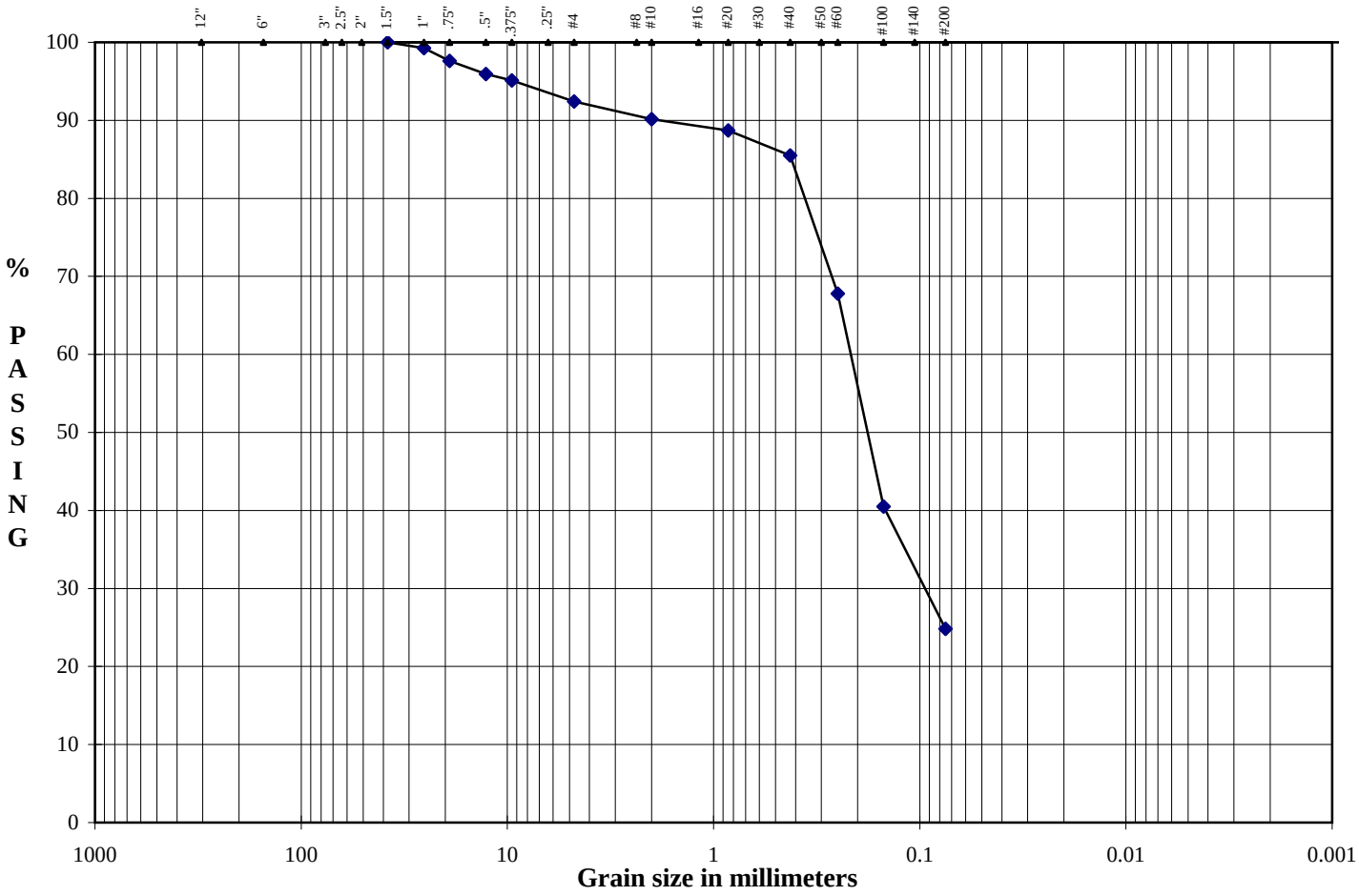
AASHID ACCREDITED

Tested By	RI
Date	03/19/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Bulk/Composite
Sample ID	30170/Composite BT	Depth/Elev.	-
Location	BT	Add. Info	TSB-03/04

ASTM D 6913 (D 422 old version), D 1140, C 136, C 117 / AASHTO T 88, T 27, T 11, T 311
Standard Test Method for Particle-Size Analysis of Soils and Aggregates (Split Sieve)

Particle-Size Analysis



Boulders	Cobbles	Gravel: Coarse	Gravel: Fine	Sand: Coarse	Sand: Medium	Sand: Fine	Fines: Silt or Clay

D_{10}	NA	mm
D_{30}	NA	mm
D_{60}	NA	mm
Cu	NA	
Cc	NA	
Project's Specific % Passing		NA
Project's Specific Particle Size, mm		NA

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AASHTO ACCRED TED

Tested By	RI
Date	03/19/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Bulk/Composite
Sample ID	30170/Composite BT	Depth/Elev.	-
Location	BT	Add. Info	TSB-03/04

ASTM D 698
Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600kN-m/m^3))

DETERMINATION OF TEST PROCEDURE

	wet	dry
Mass of Soil before sieving, g	65100.0	54292.3
Mass of Mat. Retained on No. 4 sieve, g		
Mass of Mat. Retained on 3/8" sieve, g	2663.4	2663.4
Mass of Mat. Retained on 3/4" sieve, g		

Material Retained on No. 4 Sieve, %	
Material Retained on 3/8" Sieve, %	4.9
Material Retained on 3/4" Sieve, %	
Total, % (oversized)	4.9

MOISTURE CONTENT

	Coarse + Fine Fraction	Coarse Fraction
Mass of Wet Sample & Tare, g	1798.5	2663.4
Mass of Dry Sample & Tare, g	1555.7	2663.4
Mass of Tare, g	336.0	0.0
Moisture Content, %	19.9	0.0

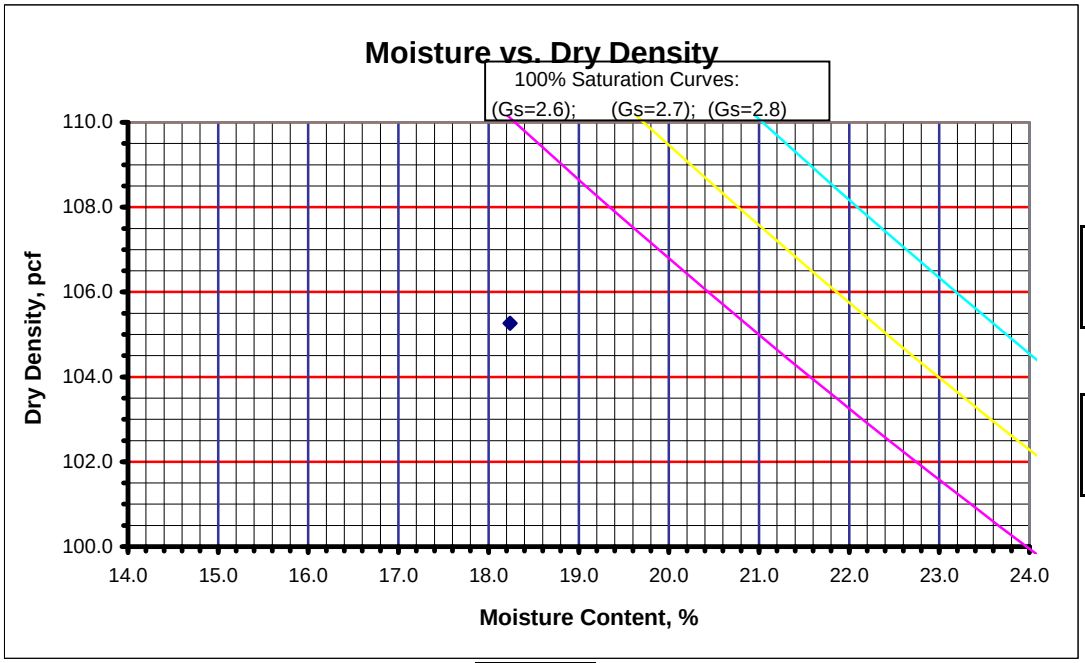
Procedure: B

TEST DATA

Points	1	2	3	4	5
Mass of Mold and Soil, g	6072.0				
Mass of Wet Sample & Tare, g	516.5				
Mass of Dry Sample & Tare, g	451.5				
Mass of Tare, g	95.1				
Moisture Content, %	18.2				
Wet Density, pcf	124.5				
Dry Density, pcf	105.3				

Mold ID Number	314
Mass of Mold, g	4192.0
Volume of Mold, ft^3	0.0333
Hammer ID Number	318
Number of Blows per layer	25
Number of Layers	3

Method A: Material retained on No. 4 Sieve≤ 25%
Method B: Material retained on 3/8" Sieve ≤ 25%
Method C: Material retained on 3/4" Sieve ≤ 30%



REMARKS
One Point Proctor was performed at as-received moisture content.

DESCRIPTION
Gray Silty Sand

USCS (ASTM D2487; D2488)
SM

AASHTO M145
NA

Maximum Dry Density, pcf		**Corrected Maximum Dry Density, pcf**	**NA**
Optimum Moisture Content, %		**Corrected Optimum Moisture Content, %**	**NA**

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SUMMARY of TESTING (Treatability Study)

T.E.S.T. Project Number: 19105-01 **DRAFT**
Project Name: Time Oil

Sample Identification					Admix							Additional Testing			Unit Weight		
T.E.S.T. Sample No.	Client Base Material No.	Mix Design No.	Batch No.	Spec. No.	GGBFS %	P. Cement IL %	P. Cement	Benton. %	Curing Age, days	UCS, psi	Moisture Content, %	pH	Volume Change, %	LEAF	Wet Density, pcf	Dry Density, pcf	Hydraul. Conduct. cm/sec
19105-01-1																	
30168	AK	1	1	1	-	12	-	0.5	7	159.4	34.8	-	-	-	115.4	85.5	-
30168	AK	1	1	2	-	12	-	0.5	14	204.4	35.0	-	-	-	115.4	85.5	-
30168	AK	1	1	3	-	12	-	0.5	28	298.2	34.7	-	-	-	114.9	85.2	-
30168	AK	1	1	4	-	12	-	0.5	Hold	-	-	-	-	-	-	-	-
30168	AK	1	1	5	-	12	-	0.5	28	-	34.9	-	-	-	114.5	84.9	2.7E-08
30168	AK	1	1	6	-	12	-	0.5	Hold	-	-	-	-	-	-	-	-
30168	AK	1	1	7	-	12	-	0.5	-	-	-	-	40.5	-	-	-	-
30168	AK	1	1	8	-	12	-	0.5	-	-	-	12.7	-	-	-	-	-
30168	AK	1	1	9	-	12	-	0.5	-	-	-	-	-	x	-	-	-
30168	AK	1	1	10	-	12	-	0.5	-	-	-	-	-	x	-	-	-
30168	AK	2	1	1	12	4	-	-	7	189.2	34.6	-	-	-	116.1	86.2	-
30168	AK	2	1	2	12	4	-	-	14	275.1	34.4	-	-	-	116.4	86.6	-
30168	AK	2	1	3	12	4	-	-	28	557.4	34.1	-	-	-	115.2	85.9	-
30168	AK	2	1	4	12	4	-	-	Hold	-	-	-	-	-	-	-	-
30168	AK	2	1	5	12	4	-	-	28	-	33.8	-	-	-	116.1	86.8	1.3E-08
30168	AK	2	1	6	12	4	-	-	Hold	-	-	-	-	-	-	-	-
30168	AK	2	1	7	12	4	-	-	-	-	-	-	-	-	-	-	-
30168	AK	2	1	8	12	4	-	-	-	-	-	12.6	-	-	-	-	-
30168	AK	2	1	9	12	4	-	-	-	-	-	-	-	TBD	-	-	-
30168	AK	2	1	10	12	4	-	-	-	-	-	-	-	TBD	-	-	-
30168	AK	3	1	1	9	3	-	-	7	174.5	31.3	-	-	-	117.6	89.5	-

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SUMMARY of TESTING (Treatability Study)

T.E.S.T. Project Number: 19105-01 **DRAFT**
Project Name: Time Oil

Sample Identification					Admix								Additional Testing			Unit Weight		
T.E.S.T. Sample No.	Client Base Material No.	Mix Design No.	Batch No.	Spec. No.	GGBFS %	P. Cement IL %	P. Cement	Benton. %	Curing Age, days	UCS, psi	Moisture Content, %	pH	Volume Change, %	LEAF	Wet Density, pcf	Dry Density, pcf	Hydraul. Conduct. cm/sec
30168	AK	3	1	2	9	3	-	-	14	267.5	31.1	-	-	-	117.8	89.8	-
30168	AK	3	1	3	9	3	-	-	28	510.8	30.7	-	-	-	117.1	89.5	-
30168	AK	3	1	4	9	3	-	-	Hold	-	-	-	-	-	-	-	-
30168	AK	3	1	5	9	3	-	-	28	-	30.5	-	-	-	117.6	90.1	1.5E-08
30168	AK	3	1	6	9	3	-	-	Hold	-	-	-	-	-	-	-	-
30168	AK	3	1	7	9	3	-	-	-	-	-	-	30.4	-	-	-	-
30168	AK	3	1	8	9	3	-	-	-	-	-	12.4	-	-	-	-	-
30168	AK	3	1	9	9	3	-	-	-	-	-	-	-	x	-	-	-
30168	AK	3	1	10	9	3	-	-	-	-	-	-	-	x	-	-	-
-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
30170	BT	1	1	1	-	12	-	0.5	7	108.6	28.7	-	-	-	120.1	93.3	-
30170	BT	1	1	2	-	12	-	0.5	14	138.8	29.2	-	-	-	117.9	91.2	-
30170	BT	1	1	3	-	12	-	0.5	28	203.1	28.6	-	-	-	121.3	94.3	-
30170	BT	1	1	4	-	12	-	0.5	Hold	-	-	-	-	-	-	-	-
30170	BT	1	1	5	-	12	-	0.5	28	-	28.9	-	-	-	119.6	92.8	2.0E-07
30170	BT	1	1	6	-	12	-	0.5	Hold	-	-	-	-	-	-	-	-
30170	BT	1	1	7	-	12	-	0.5	-	-	-	-	24.3	-	-	-	-
30170	BT	1	1	8	-	12	-	0.5	-	-	-	12.5	-	-	-	-	-
30170	BT	1	1	9	-	12	-	0.5	-	-	-	-	-	x	-	-	-
30170	BT	1	1	10	-	12	-	0.5	-	-	-	-	-	x	-	-	-
30170	BT	2	1	1	12	4	-	-	7	191.6	29.7	-	-	-	120.3	92.7	-
30170	BT	2	1	2	12	4	-	-	14	358.7	29.3	-	-	-	117.9	91.1	-

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SUMMARY of TESTING (Treatability Study)

T.E.S.T. Project Number: 19105-01

DRAFT

Project Name: Time Oil

Sample Identification					Admix										Unit Weight		
T.E.S.T. Sample No.	Client Base Material No.	Mix Design No.	Batch No.	Spec. No.	GGBFS %	P. Cement IL %	P. Cement	Benton. %	Curing Age, days	UCS, psi	Moisture Content, %	Additional Testing pH	Additional Testing Volume Change, %	Additional Testing LEAF	Wet Density, pcf	Dry Density, pcf	Hydraul. Conduct. cm/sec
30170	BT	2	1	3	12	4	-	-	28	648.3	28.8	-	-	-	119.6	92.8	-
30170	BT	2	1	4	12	4	-	-	Hold	-	-	-	-	-	-	-	-
30170	BT	2	1	5	12	4	-	-	28	-	28.6	-	-	-	119.9	93.2	2.2E-08
30170	BT	2	1	6	12	4	-	-	Hold	-	-	-	-	-	-	-	-
30170	BT	2	1	7	12	4	-	-	-	-	-	-	-	-	-	-	-
30170	BT	2	1	8	12	4	-	-	-	-	-	12.9	-	-	-	-	-
30170	BT	2	1	9	12	4	-	-	-	-	-	-	-	TBD	-	-	-
30170	BT	2	1	10	12	4	-	-	-	-	-	-	-	TBD	-	-	-
30170	BT	3	1	1	9	3	-	-	7	124.8	27.8	-	-	-	121.8	95.3	-
30170	BT	3	1	2	9	3	-	-	14	234.3	27.1	-	-	-	120.6	94.8	-
30170	BT	3	1	3	9	3	-	-	28	494.2	27.1	-	-	-	121.5	95.5	-
30170	BT	3	1	4	9	3	-	-	Hold	-	-	-	-	-	-	-	-
30170	BT	3	1	5	9	3	-	-	28	-	26.9	-	-	-	121.8	96.0	3.1E-08
30170	BT	3	1	6	9	3	-	-	Hold	-	-	-	-	-	-	-	-
30170	BT	3	1	7	9	3	-	-	-	-	-	-	20.4	-	-	-	-
30170	BT	3	1	8	9	3	-	-	-	-	-	12.5	-	-	-	-	-
30170	BT	3	1	9	9	3	-	-	-	-	-	-	-	x	-	-	-
30170	BT	3	1	10	9	3	-	-	-	-	-	-	-	x	-	-	-

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Tested By	RI
Date	03/26/19
Checked By	

ASTM D6910/API Method 13B-2

Method for Determining Marsh Funnel Flowability (Viscosity) of Clay Construction Slurries

ASTM D4380, Standard Test Method for Density of Bentonite Slurries (Mud Balance)

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Grout
Sample ID	See Below	Depth/Elev.	-
Location	-	Add. Info	-

				Mud Balance Density	
TEST Sample ID	**Client Sample ID**	**Notes**	**Marsh Funnel Flowability, sec (for 1 Qt)**	lb/gal	pcf
30168-1	Mix AK-1	Grout	45	10.5	78.5
30168-2	Mix AK-2	Grout	35	11.4	85.3
30168-3	Mix AK-3	Grout	34	11.35	84.9
30170-1	Mix BT-1	Grout	48	11.55	86.4
30170-2	Mix BT-2	Grout	36	11.75	87.9
30170-3	Mix BT-3	Grout	35	11.70	87.5

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA

AASHTO (M 145): NA

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Tested By	RI/AV
Date	03/29/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30168/Mix AK-1-1	Location	ASKO
Subsample	1	Add. Info	Curing Age, days: 7

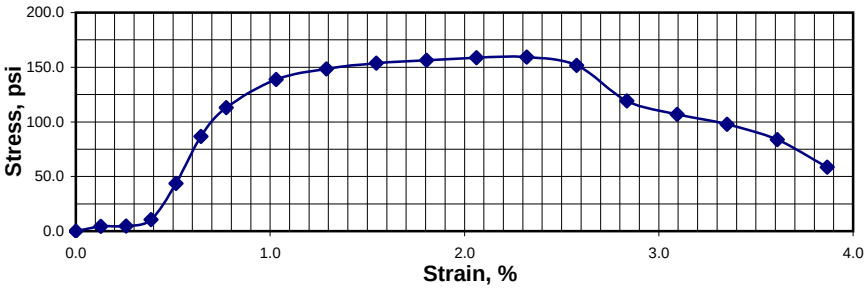
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.879
Initial Diameter, in	1.973
Height-to-Diameter Ratio	1.97
Initial Area, in^2	3.06
Initial Volume, in^3	11.86
Mass of Sample, g	359.10
Wet Density, pcf	115.4
Dry Density, pcf	85.5
Machine Speed, in/min	0.050
Strain Rate, % / min	1.29

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	496.80
Mass of Dry Sample and Tare, g	404.50
Mass of Tare, g	139.10
Moisture, %	34.8

TEST DATA

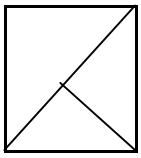
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.06	0.0
0.1	0.005	18	0.1	3.06	4.2
0.2	0.010	19	0.3	3.07	4.6
0.3	0.015	37	0.4	3.07	10.4
0.4	0.020	139	0.5	3.07	43.6
0.5	0.025	272	0.6	3.08	86.8
0.6	0.030	353	0.8	3.08	112.9
0.8	0.040	434	1.0	3.09	138.9
1.0	0.050	465	1.3	3.10	148.5
1.2	0.060	482	1.5	3.11	153.6
1.4	0.070	492	1.8	3.11	156.4
1.6	0.080	500	2.1	3.12	158.6
1.8	0.090	504	2.3	3.13	159.4
2.0	0.100	481	2.6	3.14	151.7
2.2	0.110	380	2.8	3.15	119.2
2.4	0.120	342	3.1	3.15	106.8
2.6	0.130	314	3.4	3.16	97.7
2.8	0.140	271	3.6	3.17	83.9
3.0	0.150	191	3.9	3.18	58.5

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	159.4
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	79.7
STRAIN AT FAILURE, %	2.3

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI/AV
Date	04/05/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30168/Mix AK-1-1	Location	ASKO
Subsample	2	Add. Info	Curing Age, days: 14

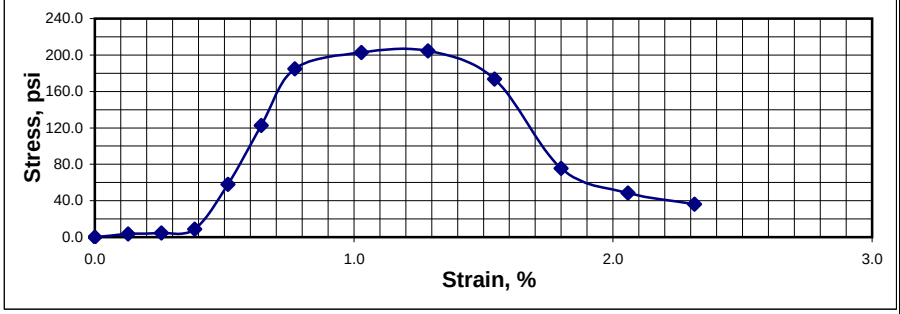
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.889
Initial Diameter, in	1.970
Height-to-Diameter Ratio	1.97
Initial Area, in^2	3.05
Initial Volume, in^3	11.85
Mass of Sample, g	359.20
Wet Density, pcf	115.4
Dry Density, pcf	85.5
Machine Speed, in/min	0.050
Strain Rate, % / min	1.29

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	499.10
Mass of Dry Sample and Tare, g	406.10
Mass of Tare, g	140.50
Moisture, %	35.0

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

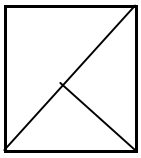
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.05	0.0
0.1	0.005	16	0.1	3.05	3.6
0.2	0.010	19	0.3	3.06	4.6
0.3	0.015	32	0.4	3.06	8.8
0.4	0.020	183	0.5	3.06	58.1
0.5	0.025	381	0.6	3.07	122.6
0.6	0.030	573	0.8	3.07	184.9
0.8	0.040	629	1.0	3.08	202.6
1.0	0.050	636	1.3	3.09	204.4
1.2	0.060	542	1.5	3.10	173.5
1.4	0.070	240	1.8	3.10	75.7
1.6	0.080	156	2.1	3.11	48.5
1.8	0.090	118	2.3	3.12	36.2

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	204.4
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	102.2
STRAIN AT FAILURE, %	1.3

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI/AV
Date	04/19/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30168/Mix AK-1-1	Location	ASKO
Subsample	3	Add. Info	Curing Age, days: 28

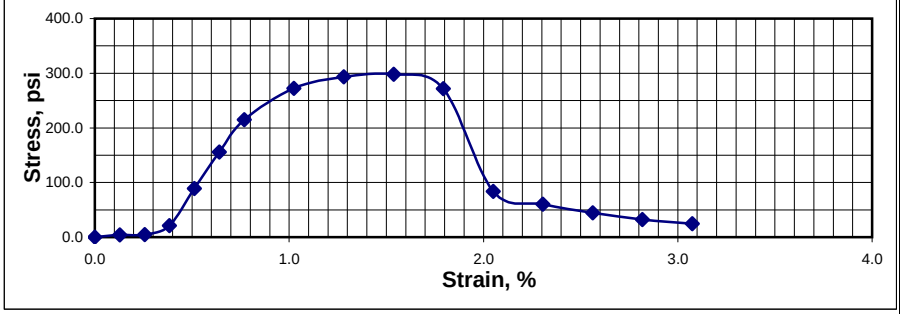
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.903
Initial Diameter, in	1.972
Height-to-Diameter Ratio	1.98
Initial Area, in^2	3.05
Initial Volume, in^3	11.92
Mass of Sample, g	359.40
Wet Density, pcf	114.9
Dry Density, pcf	85.2
Machine Speed, in/min	0.050
Strain Rate, % / min	1.28

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	431.80
Mass of Dry Sample and Tare, g	339.50
Mass of Tare, g	73.40
Moisture, %	34.7

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

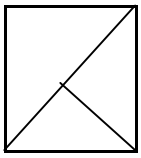
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.05	0.0
0.1	0.005	17	0.1	3.06	3.9
0.2	0.010	20	0.3	3.06	4.9
0.3	0.015	69	0.4	3.07	20.9
0.4	0.020	279	0.5	3.07	89.3
0.5	0.025	484	0.6	3.07	155.8
0.6	0.030	667	0.8	3.08	215.1
0.8	0.040	846	1.0	3.09	272.5
1.0	0.050	912	1.3	3.09	293.2
1.2	0.060	930	1.5	3.10	298.2
1.4	0.070	851	1.8	3.11	272.0
1.6	0.080	266	2.0	3.12	83.7
1.8	0.090	194	2.3	3.13	60.5
2.0	0.100	145	2.6	3.13	44.7
2.2	0.110	107	2.8	3.14	32.5
2.4	0.120	83	3.1	3.15	24.8

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	298.2
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	149.1
STRAIN AT FAILURE, %	1.5

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

TIMELY ENGINEERING SOIL TESTS, LLC
1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	EB/AV
Date	04/19/19
Checked By	LB

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30168/Mix AK-1-1	Location	ASKO
Subsample	5	Add. Info	Curing Age, days: 28

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.011	in	7.65	cm
Diameter	3.017	in	7.66	cm
Area	7.15	in^2	46.12	cm^2
Volume	352.74	cm^3	0.0125	ft^3
Mass	647.30	g	1.43	lb
Specific Gravity	2.700	(Assumed)		
Dry Density	84.9	pcf		

Moisture Content

Mass of wet sample & tare	647.30	g
Mass of dry sample & tare	479.80	g
Mass of tare	0.00	g
% Moisture	34.9	

Test Data

Speed	13	
Board Number	18	
Cell Number	14	
Flow Pump Number	2A	
Flow Pump Rate	2.80E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	101.3	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	11.3	psi
Max Head	167.41	cm
Min Head	166.71	cm
Maximum Gradient	21.86	
Minimum Gradient	21.77	

Final Data (After Test)

Average Height of Sample		3.015	in	7.66	cm
Average Diameter of Sample		3.016	in	7.66	cm
Area	7.14 in^2	46.09	cm^2		
Volume	352.97 cm^3	0.0125	ft^3		
Mass	656.40 g	1.45	lb		

Dry Density	84.9	pcf
Vol. of Voids	175.16	cm^3
Vol. of Solids	177.81	cm^3
Void Ratio	0.99	
Saturation	100.7	%

Moisture Content

Mass of wet sample & tare	729.40	g
Mass of dry sample & tare	553.20	g
Mass of tare	73.40	g
% Moisture	36.7	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
04/19/19	7	0	-	2.38	167.41	21.86	21.2	-	-	-	
04/19/19	7	10	600	2.37	166.71	21.77	21.2	2.78E-08	0.972	2.71E-08	
04/19/19	7	20	600	2.38	167.41	21.86	21.2	2.78E-08	0.972	2.71E-08	
04/19/19	7	30	600	2.37	166.71	21.77	21.2	2.78E-08	0.972	2.71E-08	*
04/19/19	7	40	600	2.38	167.41	21.86	21.2	2.78E-08	0.972	2.71E-08	*
04/19/19	7	50	600	2.37	166.71	21.77	21.2	2.78E-08	0.972	2.71E-08	*
04/19/19	8	0	600	2.37	166.71	21.77	21.2	2.79E-08	0.972	2.71E-08	*

Reported Average Hydraulic Conductivity* 2.7E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Fax: 770-923-8973
Web: www.test-llc.com
AASHTO ACCREDITED

Tested By	RI/AV
Date	03/29/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30168/Mix AK-2-1	Location	ASKO
Subsample	1	Add. Info	Curing Age, days: 7

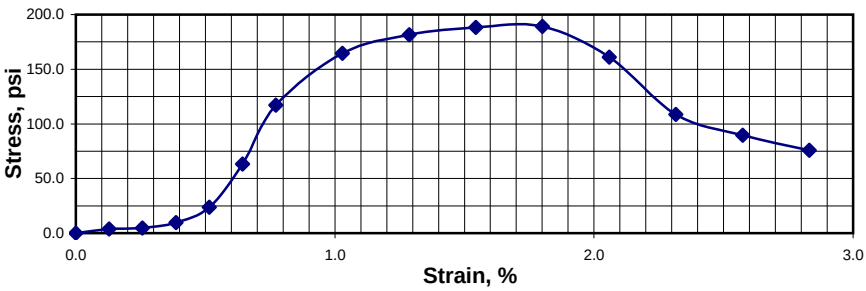
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.886
Initial Diameter, in	1.978
Height-to-Diameter Ratio	1.96
Initial Area, in^2	3.07
Initial Volume, in^3	11.94
Mass of Sample, g	363.90
Wet Density, pcf	116.1
Dry Density, pcf	86.2
Machine Speed, in/min	0.050
Strain Rate, % / min	1.29

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	501.30
Mass of Dry Sample and Tare, g	408.10
Mass of Tare, g	138.40
Moisture, %	34.6

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

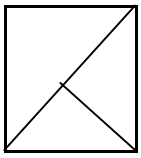
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.07	0.0
0.1	0.005	17	0.1	3.08	3.9
0.2	0.010	19	0.3	3.08	4.5
0.3	0.015	35	0.4	3.08	9.7
0.4	0.020	78	0.5	3.09	23.6
0.5	0.025	201	0.6	3.09	63.4
0.6	0.030	368	0.8	3.10	117.2
0.8	0.040	516	1.0	3.10	164.6
1.0	0.050	570	1.3	3.11	181.5
1.2	0.060	593	1.5	3.12	188.4
1.4	0.070	597	1.8	3.13	189.2
1.6	0.080	510	2.1	3.14	161.0
1.8	0.090	347	2.3	3.15	108.7
2.0	0.100	288	2.6	3.15	89.7
2.2	0.110	245	2.8	3.16	75.9

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	189.2
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	94.6
STRAIN AT FAILURE, %	1.8

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
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Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	RI/AV
Date	04/05/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30168/Mix AK-2-1	Location	ASKO
Subsample	2	Add. Info	Curing Age, days: 14

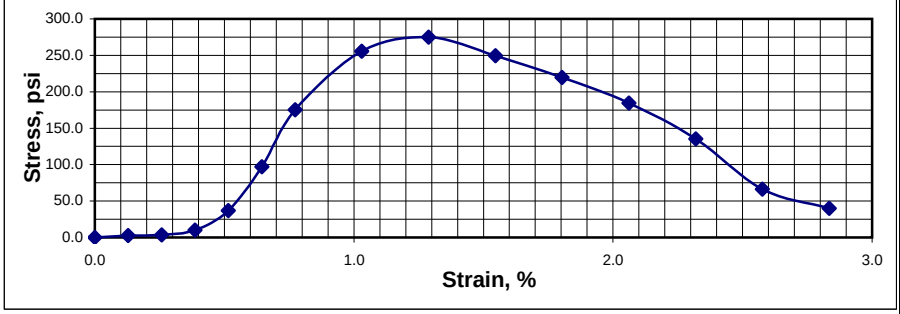
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.881
Initial Diameter, in	1.974
Height-to-Diameter Ratio	1.97
Initial Area, in^2	3.06
Initial Volume, in^3	11.88
Mass of Sample, g	363.00
Wet Density, pcf	116.4
Dry Density, pcf	86.6
Machine Speed, in/min	0.050
Strain Rate, % / min	1.29

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	503.70
Mass of Dry Sample and Tare, g	410.80
Mass of Tare, g	141.00
Moisture, %	34.4

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

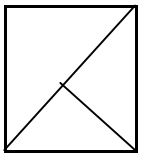
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	6	0.0	3.06	0.0
0.1	0.005	14	0.1	3.06	2.6
0.2	0.010	17	0.3	3.07	3.6
0.3	0.015	37	0.4	3.07	10.1
0.4	0.020	120	0.5	3.08	37.1
0.5	0.025	305	0.6	3.08	97.1
0.6	0.030	546	0.8	3.08	175.1
0.8	0.040	796	1.0	3.09	255.5
1.0	0.050	859	1.3	3.10	275.1
1.2	0.060	782	1.5	3.11	249.6
1.4	0.070	690	1.8	3.12	219.5
1.6	0.080	583	2.1	3.12	184.6
1.8	0.090	430	2.3	3.13	135.3
2.0	0.100	214	2.6	3.14	66.2
2.2	0.110	132	2.8	3.15	40.0

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	275.1
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	137.6
STRAIN AT FAILURE, %	1.3

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
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Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	RI/AV
Date	04/19/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30168/Mix AK-2-1	Location	ASKO
Subsample	3	Add. Info	Curing Age, days: 28

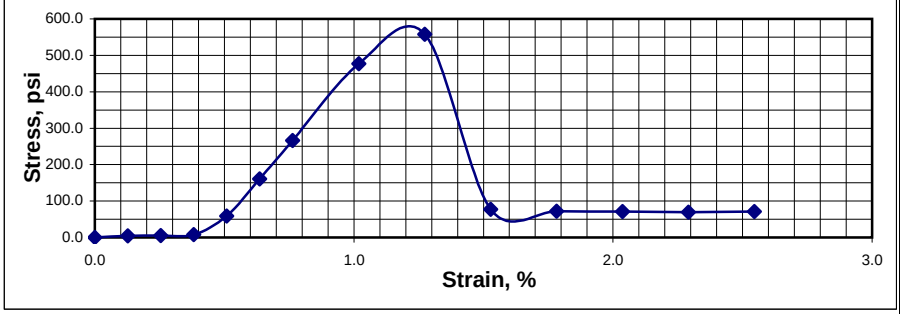
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.928
Initial Diameter, in	1.982
Height-to-Diameter Ratio	1.98
Initial Area, in^2	3.09
Initial Volume, in^3	12.12
Mass of Sample, g	366.60
Wet Density, pcf	115.2
Dry Density, pcf	85.9
Machine Speed, in/min	0.050
Strain Rate, % / min	1.27

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	435.80
Mass of Dry Sample and Tare, g	342.90
Mass of Tare, g	70.20
Moisture, %	34.1

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

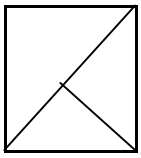
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.09	0.0
0.1	0.005	19	0.1	3.09	4.5
0.2	0.010	21	0.3	3.09	5.2
0.3	0.015	29	0.4	3.10	7.7
0.4	0.020	187	0.5	3.10	58.7
0.5	0.025	503	0.6	3.11	160.4
0.6	0.030	833	0.8	3.11	266.3
0.8	0.040	1491	1.0	3.12	476.7
1.0	0.050	1747	1.3	3.13	557.4
1.2	0.060	248	1.5	3.13	77.6
1.4	0.070	230	1.8	3.14	71.6
1.6	0.080	228	2.0	3.15	70.8
1.8	0.090	225	2.3	3.16	69.7
2.0	0.100	230	2.5	3.17	71.1

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	557.4
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	278.7
STRAIN AT FAILURE, %	1.3

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

TIMELY ENGINEERING SOIL TESTS, LLC
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Fax: 770-923-8973
Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	EB/AV
Date	04/19/19
Checked By	LB

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30168/Mix AK-2-1	Location	ASKO
Subsample	5	Add. Info	Curing Age, days: 28

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.998	in	7.61	cm
Diameter	3.013	in	7.65	cm
Area	7.13	in^2	46.00	cm^2
Volume	350.28	cm^3	0.0124	ft^3
Mass	652.30	g	1.44	lb
Specific Gravity	2.700	(Assumed)		
Dry Density	86.8	pcf		

Moisture Content

Mass of wet sample & tare	652.30	g
Mass of dry sample & tare	487.50	g
Mass of tare	0.00	g
% Moisture	33.8	

Test Data

Speed	14	
Board Number	7	
Cell Number	1	
Flow Pump Number	2B	
Flow Pump Rate	1.40E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	101.3	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	11.3	psi
Max Head	179.37	cm
Min Head	178.66	cm
Maximum Gradient	23.49	
Minimum Gradient	23.40	

Final Data (After Test)

Average Height of Sample			3.006	in	7.64 cm
Average Diameter of Sample			3.014	in	7.66 cm
Area	7.13	in^2	46.03	cm^2	
Volume	351.45	cm^3	0.0124	ft^3	
Mass	661.90	g	1.46	lb	

Dry Density	86.6	pcf
Vol. of Voids	170.84	cm^3
Vol. of Solids	180.61	cm^3
Void Ratio	0.95	
Saturation	102.0	%

Moisture Content

Mass of wet sample & tare	737.40	g
Mass of dry sample & tare	563.20	g
Mass of tare	75.70	g
% Moisture	35.7	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
04/19/19	7	0	-	2.55	179.37	23.49	21.1	-	-	-	
04/19/19	7	10	600	2.54	178.66	23.40	21.1	1.30E-08	0.974	1.26E-08	
04/19/19	7	20	600	2.55	179.37	23.49	21.1	1.30E-08	0.974	1.26E-08	
04/19/19	7	30	600	2.54	178.66	23.40	21.1	1.30E-08	0.974	1.26E-08	*
04/19/19	7	40	600	2.55	179.37	23.49	21.1	1.30E-08	0.974	1.26E-08	*
04/19/19	7	50	600	2.54	178.66	23.40	21.1	1.30E-08	0.974	1.26E-08	*
04/19/19	8	0	600	2.55	179.37	23.49	21.1	1.30E-08	0.974	1.26E-08	*

Reported Average Hydraulic Conductivity* 1.3E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	RI/AV
Date	03/29/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30168/Mix AK-3-1	Location	ASKO
Subsample	1	Add. Info	Curing Age, days: 7

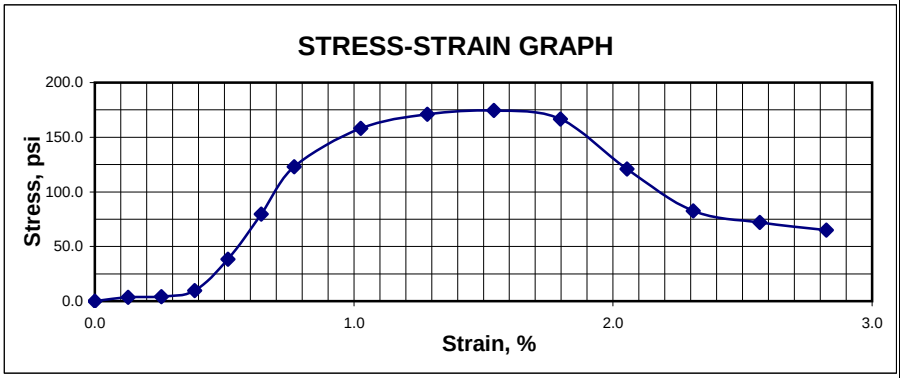
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.896
Initial Diameter, in	1.979
Height-to-Diameter Ratio	1.97
Initial Area, in^2	3.08
Initial Volume, in^3	11.98
Mass of Sample, g	370.00
Wet Density, pcf	117.6
Dry Density, pcf	89.5
Machine Speed, in/min	0.050
Strain Rate, % / min	1.28

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	506.30
Mass of Dry Sample and Tare, g	418.40
Mass of Tare, g	137.50
Moisture, %	31.3

TEST DATA

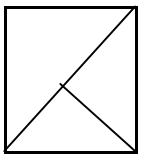
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.08	0.0
0.1	0.005	16	0.1	3.08	3.6
0.2	0.010	18	0.3	3.08	4.2
0.3	0.015	35	0.4	3.09	9.7
0.4	0.020	124	0.5	3.09	38.5
0.5	0.025	252	0.6	3.10	79.8
0.6	0.030	386	0.8	3.10	122.9
0.8	0.040	496	1.0	3.11	158.0
1.0	0.050	538	1.3	3.12	171.1
1.2	0.060	550	1.5	3.12	174.5
1.4	0.070	527	1.8	3.13	166.7
1.6	0.080	385	2.1	3.14	121.0
1.8	0.090	265	2.3	3.15	82.6
2.0	0.100	232	2.6	3.16	71.9
2.2	0.110	211	2.8	3.17	65.1

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	174.5
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	87.2
STRAIN AT FAILURE, %	1.5

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
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Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	RI/AV
Date	04/05/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30168/Mix AK-3-1	Location	ASKO
Subsample	2	Add. Info	Curing Age, days: 14

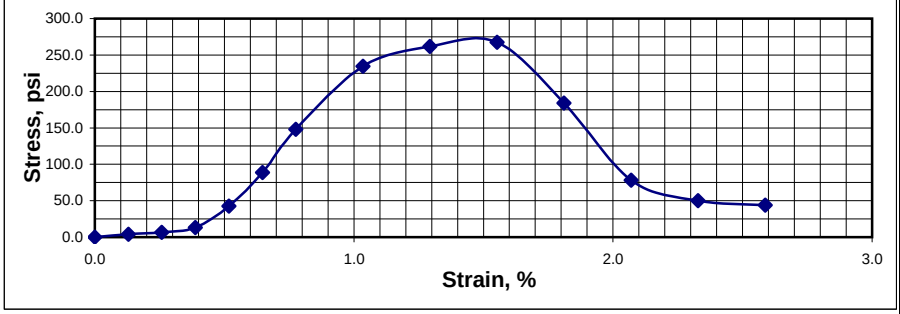
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.865
Initial Diameter, in	1.978
Height-to-Diameter Ratio	1.95
Initial Area, in^2	3.07
Initial Volume, in^3	11.88
Mass of Sample, g	367.10
Wet Density, pcf	117.8
Dry Density, pcf	89.8
Machine Speed, in/min	0.050
Strain Rate, % / min	1.29

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	505.80
Mass of Dry Sample and Tare, g	418.80
Mass of Tare, g	139.10
Moisture, %	31.1

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

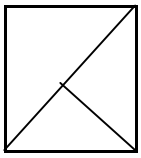
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.07	0.0
0.1	0.005	17	0.1	3.08	3.9
0.2	0.010	25	0.3	3.08	6.5
0.3	0.015	45	0.4	3.08	13.0
0.4	0.020	136	0.5	3.09	42.4
0.5	0.025	280	0.6	3.09	88.9
0.6	0.030	463	0.8	3.10	147.9
0.8	0.040	733	1.0	3.10	234.5
1.0	0.050	820	1.3	3.11	261.8
1.2	0.060	840	1.6	3.12	267.5
1.4	0.070	581	1.8	3.13	184.1
1.6	0.080	250	2.1	3.14	78.1
1.8	0.090	163	2.3	3.15	50.2
2.0	0.100	144	2.6	3.15	44.1

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	267.5
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	133.8
STRAIN AT FAILURE, %	1.6

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI/AV
Date	04/19/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30168/Mix AK-3-1	Location	ASKO
Subsample	3	Add. Info	Curing Age, days: 28

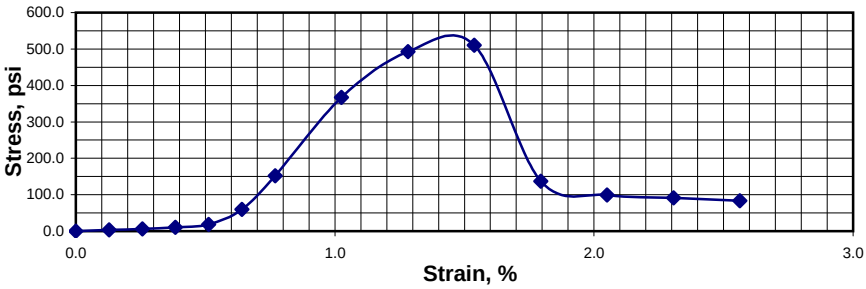
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.902
Initial Diameter, in	1.981
Height-to-Diameter Ratio	1.97
Initial Area, in^2	3.08
Initial Volume, in^3	12.03
Mass of Sample, g	369.70
Wet Density, pcf	117.1
Dry Density, pcf	89.5
Machine Speed, in/min	0.050
Strain Rate, % / min	1.28

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	439.80
Mass of Dry Sample and Tare, g	353.10
Mass of Tare, g	71.00
Moisture, %	30.7

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

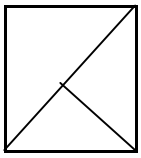
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	6	0.0	3.08	0.0
0.1	0.005	16	0.1	3.09	3.2
0.2	0.010	26	0.3	3.09	6.5
0.3	0.015	39	0.4	3.09	10.7
0.4	0.020	62	0.5	3.10	18.1
0.5	0.025	190	0.6	3.10	59.3
0.6	0.030	479	0.8	3.11	152.3
0.8	0.040	1149	1.0	3.11	367.0
1.0	0.050	1546	1.3	3.12	493.2
1.2	0.060	1605	1.5	3.13	510.8
1.4	0.070	436	1.8	3.14	137.0
1.6	0.080	318	2.1	3.15	99.2
1.8	0.090	293	2.3	3.15	91.0
2.0	0.100	270	2.6	3.16	83.5

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	510.8
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	255.4
STRAIN AT FAILURE, %	1.5

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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AASHTO ACCREDITED

Tested By	EB/AV
Date	04/19/19
Checked By	LB

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30168/Mix AK-3-1	Location	ASKO
Subsample	5	Add. Info	Curing Age, days: 28

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.007	in	7.64	cm
Diameter	3.021	in	7.67	cm
Area	7.17	in^2	46.24	cm^2
Volume	353.20	cm^3	0.0125	ft^3
Mass	665.90	g	1.47	lb
Specific Gravity	2.700	(Assumed)		
Dry Density	90.1	pcf		

Moisture Content

Mass of wet sample & tare	665.90	g
Mass of dry sample & tare	510.20	g
Mass of tare	0.00	g
% Moisture	30.5	

Test Data

Speed	14	
Board Number	8	
Cell Number	5	
Flow Pump Number	2A	
Flow Pump Rate	1.40E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	101.3	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	11.3	psi
Max Head	148.42	cm
Min Head	147.01	cm
Maximum Gradient	19.43	
Minimum Gradient	19.24	

Final Data (After Test)

Average Height of Sample		3.008	in	7.64	cm
Average Diameter of Sample		3.022	in	7.68	cm
Area	7.17 in^2	46.27	cm^2		
Volume	353.56 cm^3	0.0125	ft^3		
Mass	678.60 g	1.50	lb		

Dry Density	90.2	pcf
Vol. of Voids	164.20	cm^3
Vol. of Solids	189.35	cm^3
Void Ratio	0.87	
Saturation	101.9	%

Moisture Content

Mass of wet sample & tare	751.30	g
Mass of dry sample & tare	584.30	g
Mass of tare	74.10	g
% Moisture	32.7	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
04/19/19	8	30	-	2.10	147.71	19.33	21.1	-	-	-	
04/19/19	8	40	600	2.09	147.01	19.24	21.1	1.57E-08	0.974	1.53E-08	
04/19/19	8	50	600	2.11	148.42	19.43	21.1	1.56E-08	0.974	1.52E-08	
04/19/19	9	0	600	2.10	147.71	19.33	21.1	1.56E-08	0.974	1.52E-08	*
04/19/19	9	10	600	2.09	147.01	19.24	21.1	1.57E-08	0.974	1.53E-08	*
04/19/19	9	20	600	2.10	147.71	19.33	21.1	1.57E-08	0.974	1.53E-08	*
04/19/19	9	30	600	2.11	148.42	19.43	21.1	1.56E-08	0.974	1.52E-08	*

Reported Average Hydraulic Conductivity* 1.5E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI/AV
Date	04/01/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30170/Mix BT-1-1	Location	BT
Subsample	1	Add. Info	Curing Age, days: 7

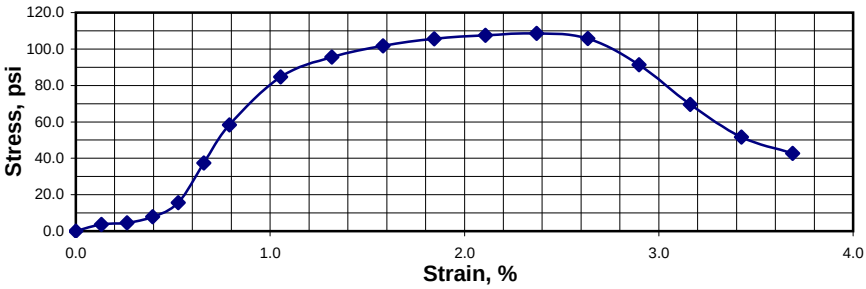
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.795
Initial Diameter, in	1.970
Height-to-Diameter Ratio	1.93
Initial Area, in^2	3.05
Initial Volume, in^3	11.57
Mass of Sample, g	364.70
Wet Density, pcf	120.1
Dry Density, pcf	93.3
Machine Speed, in/min	0.050
Strain Rate, % / min	1.32

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	487.60
Mass of Dry Sample and Tare, g	406.90
Mass of Tare, g	125.70
Moisture, %	28.7

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

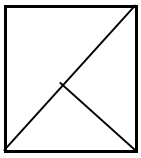
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.05	0.0
0.1	0.005	16	0.1	3.05	3.6
0.2	0.010	19	0.3	3.06	4.6
0.3	0.015	29	0.4	3.06	7.8
0.4	0.020	53	0.5	3.06	15.7
0.5	0.025	120	0.7	3.07	37.5
0.6	0.030	184	0.8	3.07	58.3
0.8	0.040	266	1.1	3.08	84.7
1.0	0.050	300	1.3	3.09	95.5
1.2	0.060	320	1.6	3.10	101.7
1.4	0.070	333	1.8	3.11	105.6
1.6	0.080	340	2.1	3.11	107.6
1.8	0.090	344	2.4	3.12	108.6
2.0	0.100	336	2.6	3.13	105.7
2.2	0.110	292	2.9	3.14	91.4
2.4	0.120	224	3.2	3.15	69.6
2.6	0.130	168	3.4	3.16	51.6
2.8	0.140	140	3.7	3.16	42.7

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	108.6
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	54.3
STRAIN AT FAILURE, %	2.4

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI/AV
Date	04/08/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30170/Mix BT-1-1	Location	BT
Subsample	2	Add. Info	Curing Age, days: 14

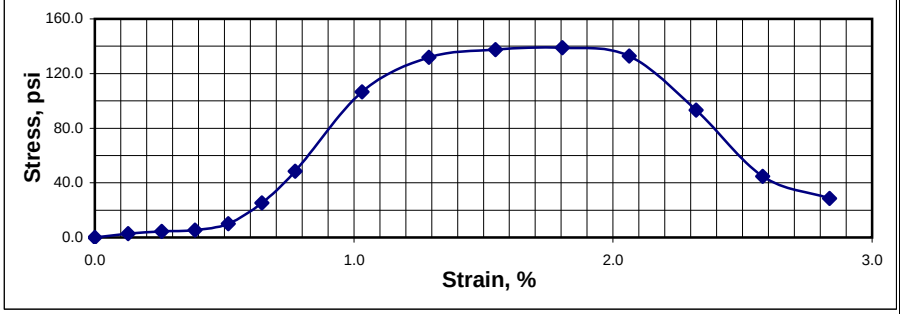
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.879
Initial Diameter, in	1.984
Height-to-Diameter Ratio	1.96
Initial Area, in^2	3.09
Initial Volume, in^3	11.99
Mass of Sample, g	371.20
Wet Density, pcf	117.9
Dry Density, pcf	91.2
Machine Speed, in/min	0.050
Strain Rate, % / min	1.29

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	441.30
Mass of Dry Sample and Tare, g	357.60
Mass of Tare, g	70.90
Moisture, %	29.2

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

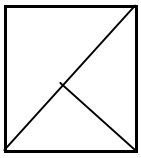
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.09	0.0
0.1	0.005	14	0.1	3.10	2.9
0.2	0.010	19	0.3	3.10	4.5
0.3	0.015	22	0.4	3.10	5.5
0.4	0.020	36	0.5	3.11	10.0
0.5	0.025	84	0.6	3.11	25.4
0.6	0.030	156	0.8	3.12	48.5
0.8	0.040	338	1.0	3.12	106.6
1.0	0.050	418	1.3	3.13	131.9
1.2	0.060	437	1.5	3.14	137.6
1.4	0.070	442	1.8	3.15	138.8
1.6	0.080	424	2.1	3.16	132.7
1.8	0.090	300	2.3	3.16	93.2
2.0	0.100	147	2.6	3.17	44.7
2.2	0.110	96	2.8	3.18	28.6

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	138.8
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	69.4
STRAIN AT FAILURE, %	1.8

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI/AV
Date	04/22/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30170/Mix BT-1-1	Location	BT
Subsample	3	Add. Info	Curing Age, days: 28

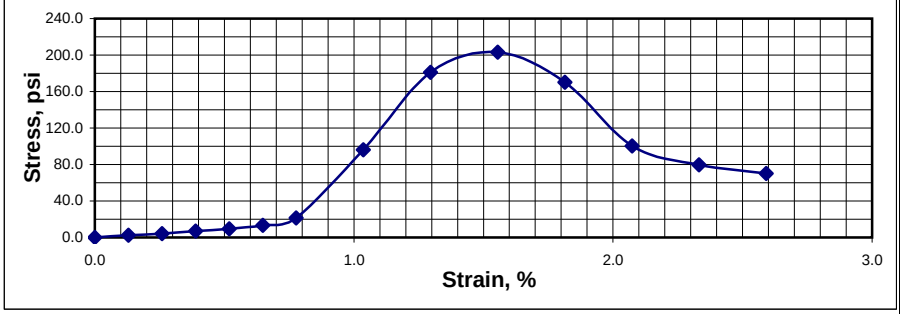
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.859
Initial Diameter, in	1.961
Height-to-Diameter Ratio	1.97
Initial Area, in^2	3.02
Initial Volume, in^3	11.66
Mass of Sample, g	371.10
Wet Density, pcf	121.3
Dry Density, pcf	94.3
Machine Speed, in/min	0.050
Strain Rate, % / min	1.30

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	439.80
Mass of Dry Sample and Tare, g	357.50
Mass of Tare, g	70.10
Moisture, %	28.6

TEST DATA

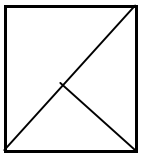
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.02	0.0
0.1	0.005	12	0.1	3.02	2.3
0.2	0.010	18	0.3	3.03	4.3
0.3	0.015	26	0.4	3.03	6.9
0.4	0.020	34	0.5	3.04	9.6
0.5	0.025	45	0.6	3.04	13.2
0.6	0.030	70	0.8	3.04	21.4
0.8	0.040	298	1.0	3.05	96.0
1.0	0.050	559	1.3	3.06	181.1
1.2	0.060	628	1.6	3.07	203.1
1.4	0.070	529	1.8	3.08	170.3
1.6	0.080	314	2.1	3.08	100.2
1.8	0.090	251	2.3	3.09	79.6
2.0	0.100	223	2.6	3.10	70.3

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	203.1
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	101.5
STRAIN AT FAILURE, %	1.6

USCS (ASTM D2487: D2488): NA

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AASHTO ACCREDITED

Tested By	EB/AV
Date	04/22/19
Checked By	LB

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30170/Mix BT-1-1	Location	BT
Subsample	5	Add. Info	Curing Age, days: 28

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.923	in	7.42	cm
Diameter	3.017	in	7.66	cm
Area	7.15	in^2	46.12	cm^2
Volume	342.43	cm^3	0.0121	ft^3
Mass	656.40	g	1.45	lb
Specific Gravity	2.700	(Assumed)		
Dry Density	92.8	pcf		

Moisture Content

Mass of wet sample & tare	656.40	g
Mass of dry sample & tare	509.10	g
Mass of tare	0.00	g
% Moisture	28.9	

Test Data

Speed	11	
Board Number	19	
Cell Number	9	
Flow Pump Number	2A	
Flow Pump Rate	1.12E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	96.2	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	6.2	psi
Max Head	89.33	cm
Min Head	88.63	cm
Maximum Gradient	12.03	
Minimum Gradient	11.93	

Final Data (After Test)

Average Height of Sample		2.924	in	7.43	cm
Average Diameter of Sample		3.018	in	7.67	cm
Area	7.15 in^2	46.15	cm^2		
Volume	342.77 cm^3	0.0121	ft^3		
Mass	666.70 g	1.47	lb		

Dry Density	92.7	pcf
Vol. of Voids	154.19	cm^3
Vol. of Solids	188.58	cm^3
Void Ratio	0.82	
Saturation	102.2	%

Moisture Content

Mass of wet sample & tare	750.10	g
Mass of dry sample & tare	592.60	g
Mass of tare	83.50	g
% Moisture	30.9	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(^oC)	@ T_x	R_T	@ 20 ^oC	
04/22/19	12	50	-	1.27	89.33	12.03	21.3	-	-	-	
04/22/19	13	0	600	1.26	88.63	11.93	21.3	2.03E-07	0.969	1.96E-07	
04/22/19	13	10	600	1.27	89.33	12.03	21.3	2.03E-07	0.969	1.96E-07	
04/22/19	13	20	600	1.26	88.63	11.93	21.3	2.03E-07	0.969	1.96E-07	*
04/22/19	13	30	600	1.27	89.33	12.03	21.3	2.03E-07	0.969	1.96E-07	*
04/22/19	13	40	600	1.26	88.63	11.93	21.3	2.03E-07	0.969	1.96E-07	*
04/22/19	13	50	600	1.27	89.33	12.03	21.3	2.03E-07	0.969	1.96E-07	*

Reported Average Hydraulic Conductivity* 2.0E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	RI/AV
Date	04/01/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30170/Mix BT-2-1	Location	BT
Subsample	1	Add. Info	Curing Age, days: 7

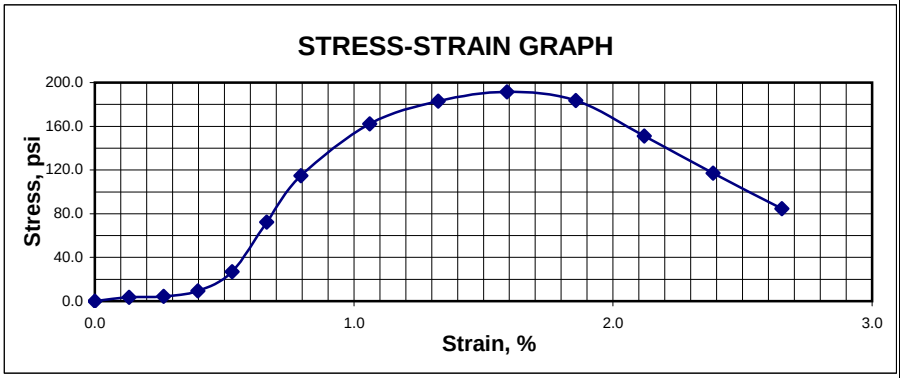
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.772
Initial Diameter, in	1.971
Height-to-Diameter Ratio	1.91
Initial Area, in^2	3.05
Initial Volume, in^3	11.51
Mass of Sample, g	363.40
Wet Density, pcf	120.3
Dry Density, pcf	92.7
Machine Speed, in/min	0.050
Strain Rate, % / min	1.33

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	555.60
Mass of Dry Sample and Tare, g	473.00
Mass of Tare, g	195.00
Moisture, %	29.7

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

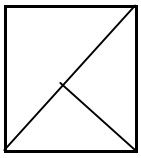
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.05	0.0
0.1	0.005	16	0.1	3.06	3.6
0.2	0.010	18	0.3	3.06	4.2
0.3	0.015	34	0.4	3.06	9.5
0.4	0.020	88	0.5	3.07	27.1
0.5	0.025	227	0.7	3.07	72.3
0.6	0.030	358	0.8	3.08	114.8
0.8	0.040	505	1.1	3.08	162.1
1.0	0.050	571	1.3	3.09	183.0
1.2	0.060	599	1.6	3.10	191.6
1.4	0.070	576	1.9	3.11	183.7
1.6	0.080	476	2.1	3.12	151.1
1.8	0.090	371	2.4	3.13	117.1
2.0	0.100	270	2.7	3.13	84.6

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	191.6
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	95.8
STRAIN AT FAILURE, %	1.6

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI/AV
Date	04/08/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30170/Mix BT-2-1	Location	BT
Subsample	2	Add. Info	Curing Age, days: 14

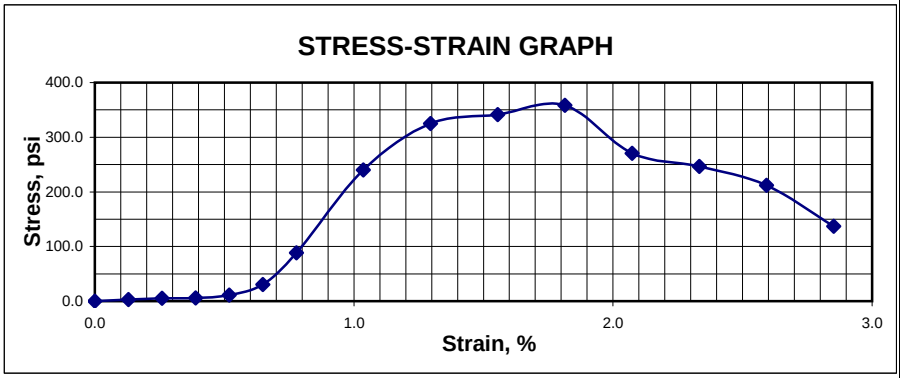
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.858
Initial Diameter, in	1.988
Height-to-Diameter Ratio	1.94
Initial Area, in^2	3.10
Initial Volume, in^3	11.98
Mass of Sample, g	370.60
Wet Density, pcf	117.9
Dry Density, pcf	91.1
Machine Speed, in/min	0.050
Strain Rate, % / min	1.30

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	439.80
Mass of Dry Sample and Tare, g	356.00
Mass of Tare, g	70.30
Moisture, %	29.3

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

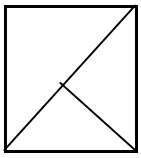
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.10	0.0
0.1	0.005	15	0.1	3.11	3.2
0.2	0.010	22	0.3	3.11	5.5
0.3	0.015	24	0.4	3.12	6.1
0.4	0.020	40	0.5	3.12	11.2
0.5	0.025	100	0.6	3.12	30.4
0.6	0.030	282	0.8	3.13	88.5
0.8	0.040	758	1.0	3.14	240.1
1.0	0.050	1027	1.3	3.14	325.0
1.2	0.060	1082	1.6	3.15	341.6
1.4	0.070	1139	1.8	3.16	358.7
1.6	0.080	863	2.1	3.17	270.7
1.8	0.090	788	2.3	3.18	246.4
2.0	0.100	681	2.6	3.19	212.1
2.2	0.110	442	2.9	3.20	136.8

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	358.7
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	179.4
STRAIN AT FAILURE, %	1.8

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	RI/AV
Date	04/22/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30170/Mix BT-2-1	Location	BT
Subsample	3	Add. Info	Curing Age, days: 28

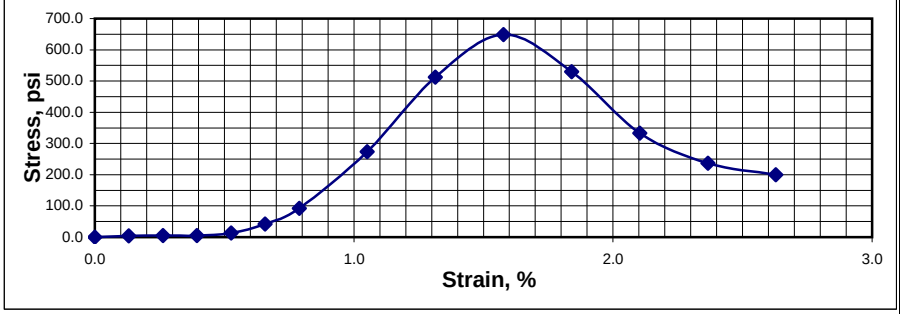
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.804
Initial Diameter, in	1.979
Height-to-Diameter Ratio	1.92
Initial Area, in^2	3.08
Initial Volume, in^3	11.70
Mass of Sample, g	367.20
Wet Density, pcf	119.6
Dry Density, pcf	92.8
Machine Speed, in/min	0.050
Strain Rate, % / min	1.31

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	445.90
Mass of Dry Sample and Tare, g	364.20
Mass of Tare, g	80.10
Moisture, %	28.8

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

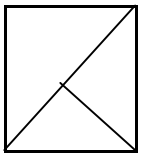
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.08	0.0
0.1	0.005	18	0.1	3.08	4.2
0.2	0.010	20	0.3	3.08	4.9
0.3	0.015	22	0.4	3.09	5.5
0.4	0.020	47	0.5	3.09	13.6
0.5	0.025	134	0.7	3.10	41.7
0.6	0.030	291	0.8	3.10	92.2
0.8	0.040	855	1.1	3.11	273.4
1.0	0.050	1602	1.3	3.12	512.4
1.2	0.060	2031	1.6	3.13	648.3
1.4	0.070	1667	1.8	3.13	530.4
1.6	0.080	1051	2.1	3.14	332.9
1.8	0.090	752	2.4	3.15	237.1
2.0	0.100	636	2.6	3.16	199.7

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	648.3
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	324.1
STRAIN AT FAILURE, %	1.6

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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AASHTO ACCREDITED

Tested By	EB/AV
Date	04/22/19
Checked By	LB

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30170/Mix BT-2-1	Location	BT
Subsample	5	Add. Info	Curing Age, days: 28

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.908	in	7.39	cm
Diameter	3.024	in	7.68	cm
Area	7.18	in^2	46.34	cm^2
Volume	342.25	cm^3	0.0121	ft^3
Mass	657.60	g	1.45	lb
Specific Gravity	2.700	(Assumed)		
Dry Density	93.2	pcf		

Moisture Content

Mass of wet sample & tare	657.60	g
Mass of dry sample & tare	511.30	g
Mass of tare	0.00	g
% Moisture	28.6	

Test Data

Speed	13	
Board Number	5	
Cell Number	2	
Flow Pump Number	2A	
Flow Pump Rate	2.80E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	96.2	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	6.2	psi
Max Head	199.06	cm
Min Head	198.36	cm
Maximum Gradient	26.94	
Minimum Gradient	26.85	

Final Data (After Test)

Average Height of Sample		2.909	in	7.39	cm
Average Diameter of Sample		3.025	in	7.68	cm
Area	7.19 in^2	46.37	cm^2		
Volume	342.60 cm^3	0.0121	ft^3		
Mass	666.50 g	1.47	lb		

Dry Density	93.2	pcf
Vol. of Voids	153.14	cm^3
Vol. of Solids	189.46	cm^3
Void Ratio	0.81	
Saturation	101.2	%

Moisture Content

Mass of wet sample & tare	748.20	g
Mass of dry sample & tare	593.30	g
Mass of tare	82.00	g
% Moisture	30.3	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
04/22/19	14	0	-	2.83	199.06	26.94	21.3	-	-	-	
04/22/19	14	10	600	2.82	198.36	26.85	21.3	2.25E-08	0.969	2.18E-08	
04/22/19	14	20	600	2.83	199.06	26.94	21.3	2.25E-08	0.969	2.18E-08	
04/22/19	14	30	600	2.82	198.36	26.85	21.3	2.25E-08	0.969	2.18E-08	*
04/22/19	14	40	600	2.83	199.06	26.94	21.3	2.25E-08	0.969	2.18E-08	*
04/22/19	14	50	600	2.82	198.36	26.85	21.3	2.25E-08	0.969	2.18E-08	*
04/22/19	15	0	600	2.83	199.06	26.94	21.3	2.25E-08	0.969	2.18E-08	*

Reported Average Hydraulic Conductivity* 2.2E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI/AV
Date	04/01/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30170/Mix BT-3-1	Location	BT
Subsample	1	Add. Info	Curing Age, days: 7

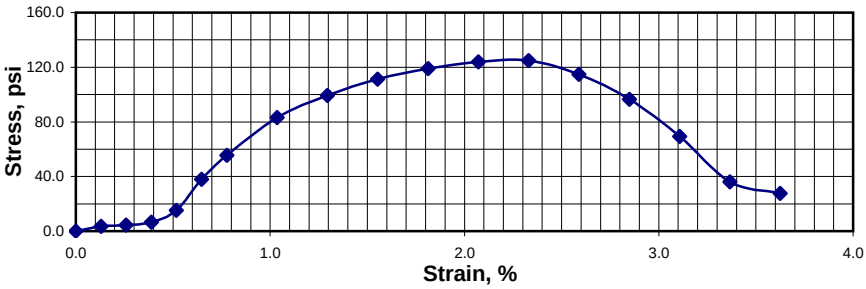
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.862
Initial Diameter, in	1.974
Height-to-Diameter Ratio	1.96
Initial Area, in^2	3.06
Initial Volume, in^3	11.82
Mass of Sample, g	378.00
Wet Density, pcf	121.8
Dry Density, pcf	95.3
Machine Speed, in/min	0.050
Strain Rate, % / min	1.29

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	505.20
Mass of Dry Sample and Tare, g	423.50
Mass of Tare, g	129.90
Moisture, %	27.8

TEST DATA

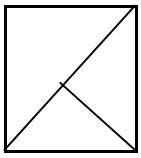
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	6	0.0	3.06	0.0
0.1	0.005	17	0.1	3.06	3.6
0.2	0.010	20	0.3	3.07	4.6
0.3	0.015	26	0.4	3.07	6.5
0.4	0.020	53	0.5	3.08	15.3
0.5	0.025	123	0.6	3.08	38.0
0.6	0.030	177	0.8	3.08	55.4
0.8	0.040	263	1.0	3.09	83.1
1.0	0.050	314	1.3	3.10	99.3
1.2	0.060	352	1.6	3.11	111.3
1.4	0.070	377	1.8	3.12	119.0
1.6	0.080	393	2.1	3.13	123.8
1.8	0.090	397	2.3	3.13	124.8
2.0	0.100	367	2.6	3.14	114.9
2.2	0.110	310	2.8	3.15	96.5
2.4	0.120	225	3.1	3.16	69.3
2.6	0.130	120	3.4	3.17	36.0
2.8	0.140	94	3.6	3.18	27.7

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	124.8
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	62.4
STRAIN AT FAILURE, %	2.3

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI/AV
Date	04/08/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30170/Mix BT-3-1	Location	BT
Subsample	2	Add. Info	Curing Age, days: 14

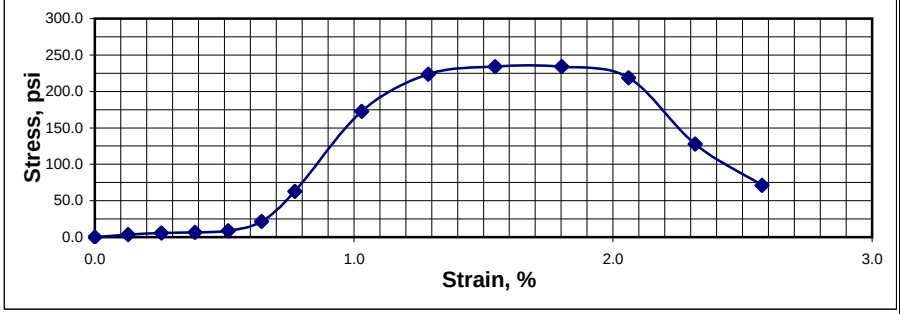
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.884
Initial Diameter, in	1.983
Height-to-Diameter Ratio	1.96
Initial Area, in^2	3.09
Initial Volume, in^3	12.00
Mass of Sample, g	379.80
Wet Density, pcf	120.6
Dry Density, pcf	94.8
Machine Speed, in/min	0.050
Strain Rate, % / min	1.29

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	449.60
Mass of Dry Sample and Tare, g	368.70
Mass of Tare, g	70.70
Moisture, %	27.1

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

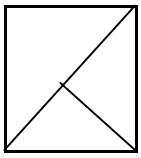
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.09	0.0
0.1	0.005	16	0.1	3.09	3.6
0.2	0.010	23	0.3	3.10	5.8
0.3	0.015	25	0.4	3.10	6.5
0.4	0.020	32	0.5	3.10	8.7
0.5	0.025	72	0.6	3.11	21.6
0.6	0.030	200	0.8	3.11	62.7
0.8	0.040	544	1.0	3.12	172.7
1.0	0.050	704	1.3	3.13	223.4
1.2	0.060	740	1.5	3.14	234.3
1.4	0.070	742	1.8	3.15	234.3
1.6	0.080	695	2.1	3.15	218.8
1.8	0.090	409	2.3	3.16	127.8
2.0	0.100	230	2.6	3.17	71.0

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	234.3
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	117.2
STRAIN AT FAILURE, %	1.8

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Phone: 770-938-8233
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AASHTO ACCREDITED

Tested By	RI/AV
Date	04/22/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30170/Mix BT-3-1	Location	BT
Subsample	3	Add. Info	Curing Age, days: 28

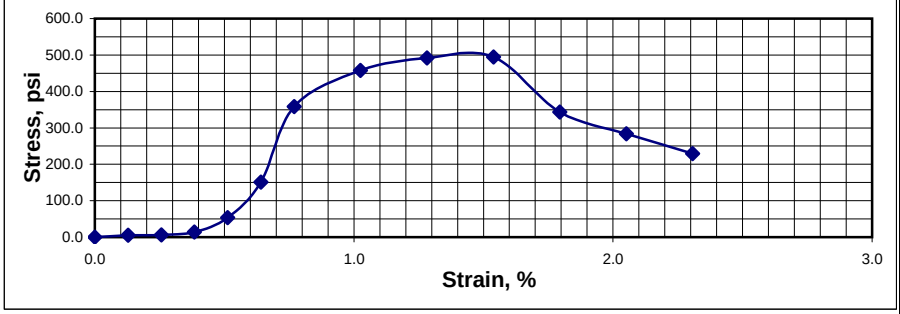
ASTM D 2166
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.900
Initial Diameter, in	1.979
Height-to-Diameter Ratio	1.97
Initial Area, in^2	3.08
Initial Volume, in^3	12.00
Mass of Sample, g	382.50
Wet Density, pcf	121.5
Dry Density, pcf	95.5
Machine Speed, in/min	0.050
Strain Rate, % / min	1.28

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	452.30
Mass of Dry Sample and Tare, g	371.00
Mass of Tare, g	71.10
Moisture, %	27.1

TEST DATA

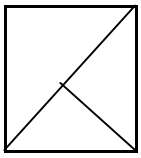
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.08	0.0
0.1	0.005	20	0.1	3.08	4.9
0.2	0.010	23	0.3	3.08	5.8
0.3	0.015	48	0.4	3.09	13.9
0.4	0.020	170	0.5	3.09	53.4
0.5	0.025	473	0.6	3.10	151.2
0.6	0.030	1115	0.8	3.10	358.1
0.8	0.040	1427	1.0	3.11	457.6
1.0	0.050	1537	1.3	3.12	491.7
1.2	0.060	1549	1.5	3.12	494.2
1.4	0.070	1080	1.8	3.13	343.2
1.6	0.080	895	2.1	3.14	283.4
1.8	0.090	726	2.3	3.15	229.0

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	494.2
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	247.1
STRAIN AT FAILURE, %	1.5

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

TIMELY ENGINEERING SOIL TESTS, LLC
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Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	EB/AV
Date	04/22/19
Checked By	LB

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30170/Mix BT-3-1	Location	BT
Subsample	5	Add. Info	Curing Age, days: 28

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.947	in	7.49	cm
Diameter	3.023	in	7.68	cm
Area	7.18	in^2	46.31	cm^2
Volume	346.61	cm^3	0.0122	ft^3
Mass	676.70	g	1.49	lb
Specific Gravity	2.700	(Assumed)		
Dry Density	96.0	pcf		

Moisture Content

Mass of wet sample & tare	676.70	g
Mass of dry sample & tare	533.20	g
Mass of tare	0.00	g
% Moisture	26.9	

Test Data

Speed	13	
Board Number	6	
Cell Number	11	
Flow Pump Number	2B	
Flow Pump Rate	2.80E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	96.2	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	6.2	psi
Max Head	141.38	cm
Min Head	140.68	cm
Maximum Gradient	18.88	
Minimum Gradient	18.79	

Final Data (After Test)

Average Height of Sample			2.948	in	7.49 cm
Average Diameter of Sample			3.024	in	7.68 cm
Area	7.18	in^2	46.34	cm^2	
Volume	346.96	cm^3	0.0123	ft^3	
Mass	686.00	g	1.51	lb	

Dry Density	95.9	pcf
Vol. of Voids	149.42	cm^3
Vol. of Solids	197.54	cm^3
Void Ratio	0.76	
Saturation	102.2	%

Moisture Content

Mass of wet sample & tare	769.90	g
Mass of dry sample & tare	617.30	g
Mass of tare	84.10	g
% Moisture	28.6	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
04/22/19	14	0	-	2.01	141.38	18.88	21.3	-	-	-	
04/22/19	14	10	600	2.00	140.68	18.79	21.3	3.21E-08	0.969	3.11E-08	
04/22/19	14	20	600	2.01	141.38	18.88	21.3	3.21E-08	0.969	3.11E-08	
04/22/19	14	30	600	2.00	140.68	18.79	21.3	3.21E-08	0.969	3.11E-08	*
04/22/19	14	40	600	2.01	141.38	18.88	21.3	3.21E-08	0.969	3.11E-08	*
04/22/19	14	50	600	2.00	140.68	18.79	21.3	3.21E-08	0.969	3.11E-08	*
04/22/19	15	0	600	2.01	141.38	18.88	21.3	3.21E-08	0.969	3.11E-08	*

Reported Average Hydraulic Conductivity* 3.1E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	RI
Date	04/25/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Location	ASKO	Depth/Elev.	-
		Add. Info	TSB-01/02

Volume Increase Determination

Sub-Sample ID	Empty Mold Mass, g	Mold + Soil/Grout Mass, g	Soil/Grout Mass, g	Initial Soil Volume Calculated, cm^3	Sample Volume cm^3	Mold's Headspace Volume, cm^3	Final Soil/Grout Volume, cm^3	% Volume Change
1-7; 9-12				NA	4065.5	0.0	4065.5	-
				NA				-
				NA				-
TOTAL				**2894.2**	**4065.5**	0.00	**4065.5**	**40.5**

1 Point Proctor (@ as-received MC) wet density of soil used for initial volume calculation: 128.5 pcf — **2.059** g/cm^3

Initial vol. of soil (based on 100% of Proctor wet density): **2894.2** cm^3

Mix Design # AK-1

Ingredient	Amount	Unit	Portion of entire mix
Soil (Waste)	5960.00	g	0.761
Water	1250.00	mL	0.160
Cement	600.00	g	0.077
Bentonite	25.00	g	0.003
Total	7835.00	-	1.000

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AASHTO ACCREDITED

Tested By	RI
Date	04/25/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30168/Mix AK-1	Depth/Elev.	-
Location	ASKO	Add. Info	TSB-01/02

Final Total Volume DETERMINATION (after mixing)

Sample ID	Mold #	Mass of Mold, g	Mass of Wet Sample & Mold, g	Height of Mold, in.	Diameter of Mold, in.	Volume of Mold, ft^3	Wet Density, pcf	Comments
30168-1-1-1	-	-	-	4.0	2.0	0.00727	NA	
30168-1-1-2	-	-	-	4.0	2.0	0.00727	NA	
30168-1-1-3	-	-	-	4.0	2.0	0.00727	NA	
30168-1-1-4	-	-	-	4.0	2.0	0.00727	NA	
30168-1-1-5	-	-	-	3.0	3.0	0.01227	NA	
30168-1-1-6	-	-	-	3.0	3.0	0.01227	NA	
30168-1-1-7	-	-	-	7.7	4.0	0.05589	NA	
30168-1-1-9	-	-	-	4.0	2.0	0.00727	NA	
30168-1-1-10	-	-	-	4.0	2.0	0.00727	NA	
30168-1-1-11	-	-	-	3.0	3.0	0.01227	NA	
30168-1-1-12	-	-	-	4.0	2.0	0.00727	NA	
	-	-	-					
	-	-	-					
	-	-	-					
	-	-	-					
Total						0.14357		

Comments

Balance ID Number	12/13/14/15
Oven ID Number	1/6/7
Caliper ID Number	16

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Tested By	RI
Date	04/25/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Location	ASKO	Depth/Elev.	-
		Add. Info	TSB-01/02

Volume Increase Determination

Sub-Sample ID	Empty Mold Mass, g	Mold + Soil/Grout Mass, g	Soil/Grout Mass, g	Initial Soil Volume Calculated, cm^3	Sample Volume cm^3	Mold's Headspace Volume, cm^3	Final Soil/Grout Volume, cm^3	% Volume Change
1-7; 9-12				NA	3773.2	0.0	3773.2	-
				NA				-
				NA				-
TOTAL				**2894.2**	**3773.2**	0.00	**3773.2**	**30.4**

1 Point Proctor (@ as-received MC) wet density of soil used for initial volume calculation: 128.5 pcf **2.059** g/cm^3

Initial vol. of soil (based on 100% of Proctor wet density): 2894.2 cm^3

Mix Design # AK-3

Ingredient	Amount	Unit	Portion of entire mix
Soil (Waste)	5960.00	g	0.799
Water	900.00	mL	0.121
Cement	150.00	g	0.020
GGBFS	450.00	g	0.060
Total	7460.00	-	1.000

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Tested By	RI
Date	04/25/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30168/Mix AK-3	Depth/Elev.	-
Location	ASKO	Add. Info	TSB-01/02

Final Total Volume DETERMINATION (after mixing)

Sample ID	Mold #	Mass of Mold, g	Mass of Wet Sample & Mold, g	Height of Mold, in.	Diameter of Mold, in.	Volume of Mold, ft^3	Wet Density, pcf	Comments
30168-3-1-1	-	-	-	4.0	2.0	0.00727	NA	
30168-3-1-2	-	-	-	4.0	2.0	0.00727	NA	
30168-3-1-3	-	-	-	4.0	2.0	0.00727	NA	
30168-3-1-4	-	-	-	4.0	2.0	0.00727	NA	
30168-3-1-5	-	-	-	3.0	3.0	0.01227	NA	
30168-3-1-6	-	-	-	3.0	3.0	0.01227	NA	
30168-3-1-7	-	-	-	6.3	4.0	0.04557	NA	
30168-3-1-9	-	-	-	4.0	2.0	0.00727	NA	
30168-3-1-10	-	-	-	4.0	2.0	0.00727	NA	
30168-3-1-11	-	-	-	3.0	3.0	0.01227	NA	
30168-3-1-12	-	-	-	4.0	2.0	0.00727	NA	
	-	-	-					
	-	-	-					
	-	-	-					
Total						0.13325		

Comments

Balance ID Number	12/13/14/15
Oven ID Number	1/6/7
Caliper ID Number	16

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Tested By	RI
Date	04/25/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Location	BT	Depth/Elev.	-
		Add. Info	TSB-03/04

Volume Increase Determination

Sub-Sample ID	Empty Mold Mass, g	Mold + Soil/Grout Mass, g	Soil/Grout Mass, g	Initial Soil Volume Calculated, cm^3	Sample Volume cm^3	Mold's Headspace Volume, cm^3	Final Soil/Grout Volume, cm^3	% Volume Change
1-7; 9-12				NA	3680.6	0.0	3680.6	-
				NA				-
				NA				-
TOTAL				**2962.1**	**3680.6**	0.00	**3680.6**	**24.3**

1 Point Proctor (@ as-received MC) wet density of soil used for initial volume calculation: 124.5 pcf **1.995** g/cm^3

Initial vol. of soil (based on 100% of Proctor wet density): **2962.1** cm^3

Mix Design # BT-1

Ingredient	Amount	Unit	Portion of entire mix
Soil (Waste)	5910.00	g	0.791
Water	938.00	mL	0.126
Cement	600.00	g	0.080
Bentonite	25.00	g	0.003
Total	7473.00	-	1.000

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Tested By	RI
Date	04/25/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30170/Mix BT-1	Depth/Elev.	-
Location	BT	Add. Info	TSB-03/04

Final Total Volume DETERMINATION (after mixing)

Sample ID	Mold #	Mass of Mold, g	Mass of Wet Sample & Mold, g	Height of Mold, in.	Diameter of Mold, in.	Volume of Mold, ft^3	Wet Density, pcf	Comments
30170-1-1-1	-	-	-	4.0	2.0	0.00727	NA	
30170-1-1-2	-	-	-	4.0	2.0	0.00727	NA	
30170-1-1-3	-	-	-	4.0	2.0	0.00727	NA	
30170-1-1-4	-	-	-	4.0	2.0	0.00727	NA	
30170-1-1-5	-	-	-	3.0	3.0	0.01227	NA	
30170-1-1-6	-	-	-	3.0	3.0	0.01227	NA	
30170-1-1-7	-	-	-	5.8	4.0	0.04230	NA	
30170-1-1-9	-	-	-	4.0	2.0	0.00727	NA	
30170-1-1-10	-	-	-	4.0	2.0	0.00727	NA	
30170-1-1-11	-	-	-	3.0	3.0	0.01227	NA	
30170-1-1-12	-	-	-	4.0	2.0	0.00727	NA	
	-	-	-					
	-	-	-					
	-	-	-					
	-	-	-					
Total						0.12998		

Comments

Balance ID Number	12/13/14/15
Oven ID Number	1/6/7
Caliper ID Number	16

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AASHTO ACCREDITED

Tested By	RI
Date	04/25/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Location	BT	Depth/Elev.	-
		Add. Info	TSB-03/04

Volume Increase Determination

Sub-Sample ID	Empty Mold Mass, g	Mold + Soil/Grout Mass, g	Soil/Grout Mass, g	Initial Soil Volume Calculated, cm^3	Sample Volume cm^3	Mold's Headspace Volume, cm^3	Final Soil/Grout Volume, cm^3	% Volume Change
1-7; 9-12				NA	3567.4	0.0	3567.4	-
				NA				-
				NA				-
TOTAL				**2962.1**	**3567.4**	0.00	**3567.4**	**20.4**

1 Point Proctor (@ as-received MC) wet density of soil used for initial volume calculation: 124.5 pcf | **1.995** g/cm^3

Initial vol. of soil (based on 100% of Proctor wet density): **2962.1** cm^3

Mix Design # BT-3

Ingredient	Amount	Unit	Portion of entire mix
Soil (Waste)	5910.00	g	0.814
Water	750.00	mL	0.103
Cement	150.00	g	0.021
GGBFS	450.00	g	0.062
Total	7260.00	-	1.000

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AASHTO ACCREDITED

Tested By	RI
Date	04/25/19
Checked By	

Client Pr. #	CHE8384	Lab. PR. #	19105-01-1
Pr. Name	Time Oil	S. Type	Mold
Sample ID	30170/Mix BT-3	Depth/Elev.	-
Location	BT	Add. Info	TSB-03/04

Final Total Volume DETERMINATION (after mixing)

Sample ID	Mold #	Mass of Mold, g	Mass of Wet Sample & Mold, g	Height of Mold, in.	Diameter of Mold, in.	Volume of Mold, ft^3	Wet Density, pcf	Comments
30170-3-1-1	-	-	-	4.0	2.0	0.00727	NA	
30170-3-1-2	-	-	-	4.0	2.0	0.00727	NA	
30170-3-1-3	-	-	-	4.0	2.0	0.00727	NA	
30170-3-1-4	-	-	-	4.0	2.0	0.00727	NA	
30170-3-1-5	-	-	-	3.0	3.0	0.01227	NA	
30170-3-1-6	-	-	-	3.0	3.0	0.01227	NA	
30170-3-1-7	-	-	-	5.3	4.0	0.03831	NA	
30170-3-1-9	-	-	-	4.0	2.0	0.00727	NA	
30170-3-1-10	-	-	-	4.0	2.0	0.00727	NA	
30170-3-1-11	-	-	-	3.0	3.0	0.01227	NA	
30170-3-1-12	-	-	-	4.0	2.0	0.00727	NA	
	-	-	-					
	-	-	-					
	-	-	-					
	-	-	-					
Total						0.12598		

Comments

Balance ID Number	12/13/14/15
Oven ID Number	1/6/7
Caliper ID Number	16

Appendix B
Analytical Lab Reports

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-87908-1
Client Project/Site: Time Oil CHE8384

For:
Geosyntec Consultants, Inc.
1420 Kensington Rd. , Ste. 103
Oak Brook, Illinois 60523

Attn: Jule Carr

Authorized for release by:
4/4/2019 9:07:14 AM

Carrie Gamber, Senior Project Manager
(412)963-2428
carrie.gamber@testamericainc.com

PA Lab ID: 02-00416

Table of Contents

Job ID: 180-87908-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

CASE NARRATIVE

Client: Geosyntec Consultants, Inc.

Project: Time Oil CHE8384

Report Number: 180-87908-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The samples were received on 03/21/2019; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.7 C.

The Field Sampler was not listed on the Chain of Custody.

VOLATILES
The following sample was diluted to bring the concentration of target analytes within the calibration range: TO-CS-BT-01 (180-87908-2). Elevated reporting limits (RLs) are provided.

Internal standard (ISTD) response for TBA-d9 for the following samples were outside acceptance criteria: TO-CS-BT-01 (180-87908-2), (LCS 180-273901/2-A), (180-87908-C-2-A MS) and (180-87908-C-2-A MSD). This ISTD does not correspond to any of the requested target compounds; therefore, the data have been reported.

Internal standard (ISTD) response for 1,4-Dichlorobenzene-d4 for the following samples were outside acceptance criteria: TO-CS-BT-01 (180-87908-2) and (180-87908-C-2-A MS). This ISTD does not correspond to any of the requested target compounds; therefore, the data have been reported.

m-Xylene & p-Xylene and Xylenes, Total failed the recovery criteria high for the MS of sample TO-CS-BT-01 (180-87908-2) in batch 180-273899. m-Xylene & p-Xylene, o-Xylene and Xylenes, Total failed the recovery criteria high for the MSD of sample TO-CS-BT-01 (180-87908-2) in batch 180-273899.

GRO
Sample TO-CS-BT-01 (180-87908-2) required dilution prior to analysis. The reporting limits have been adjusted accordingly.

Trifluorotoluene (Surr) failed the surrogate recovery criteria high for TO-CS-BT-01 (180-87908-2).

DRO
Sample TO-CS-BT-01 (180-87908-2) required dilution prior to analysis. The reporting limits have been adjusted accordingly.

The continuing calibration verification (CCV) associated with batch 240-373924 recovered above the upper control limit for Diesel Range Organics [C10 - C28]. The sample associated with this CCV was at an estimated level for the affected analytes; therefore, the data have been reported. The following sample was impacted: TO-CS-AK-01 (180-87908-1).

Job ID: 180-87908-1 (Continued)

Laboratory: Eurofins TestAmerica, Pittsburgh (Continued)

PERCENT SOLIDS

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87908-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits

GC Semi VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc. Job ID: 180-87908-1
Project/Site: Time Oil CHE8384

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arkansas DEQ	State Program	6	88-0690	06-27-19
California	State Program	9	2891	04-30-19 *
Connecticut	State Program	1	PH-0688	09-30-20
Florida	NELAP	4	E871008	06-30-19
Illinois	NELAP	5	200005	06-30-19
Kansas	NELAP	7	E-10350	01-31-20
Louisiana	NELAP	6	04041	06-30-19
Nevada	State Program	9	PA00164	07-31-19
New Hampshire	NELAP	1	2030	04-04-19 *
New Jersey	NELAP	2	PA005	06-30-19
New York	NELAP	2	11182	03-31-20
North Carolina (WW/SW)	State Program	4	434	12-31-19
Oregon	NELAP	10	PA-2151	01-28-19 *
Pennsylvania	NELAP	3	02-00416	04-30-19
South Carolina	State Program	4	89014	04-30-19 *
Texas	NELAP	6	T104704528-15-2	03-31-20
US Fish & Wildlife	Federal		LE94312A-1	07-31-19
USDA	Federal		P330-16-00211	06-26-19
Utah	NELAP	8	PA001462015-4	05-31-19 *
Virginia	NELAP	3	460189	09-14-19
West Virginia DEP	State Program	3	142	01-31-20
Wisconsin	State Program	5	998027800	08-31-19

Laboratory: Eurofins TestAmerica, Canton

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Washington	State Program	10	C971	01-12-20 *

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8015D	3546	Solid	C10-C34
8015D	5035	Solid	Gasoline Range Organics [C6 - C10]

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

TestAmerica Job ID: 180-87908-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-87908-1	TO-CS-AK-01	Solid	03/20/19 11:00	03/21/19 08:35
180-87908-2	TO-CS-BT-01	Solid	03/20/19 11:00	03/21/19 08:35

Method Summary

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87908-1

Method	Method Description	Protocol	Laboratory
EPA 8260C	Volatile Organic Compounds by GC/MS	SW846	TAL PIT
8015D	Gasoline Range Organics (GRO) (GC)	SW846	TAL CAN
8015D	Diesel Range Organics (DRO) (GC)	SW846	TAL CAN
2540G	SM 2540G	SM22	TAL PIT
3546	Microwave Extraction	SW846	TAL CAN
5035	Closed System Purge and Trap	SW846	TAL CAN
5035	Closed System Purge and Trap	SW846	TAL PIT

Protocol References:

SM22 = Standard Methods For The Examination Of Water And Wastewater, 22nd Edition

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87908-1

Client Sample ID: TO-CS-AK-01
Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Lab Sample ID: 180-87908-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			274119	03/27/19 13:33	TAM	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-CS-AK-01
Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Lab Sample ID: 180-87908-1
Matrix: Solid
Percent Solids: 82.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.0604 g	5 mL	273625	03/22/19 06:00	KLG	TAL PIT
Total/NA	Analysis	EPA 8260C		1	5 mL	5 mL	273616	03/22/19 09:50	KLG	TAL PIT
	Instrument ID: CHHP3									
Total/NA	Prep	5035			5.98 g	5 mL	373281	03/22/19 10:37	LKG	TAL CAN
Total/NA	Analysis	8015D		1	5 g	5 mL	373284	03/26/19 12:59	KMG	TAL CAN
	Instrument ID: AFID									
Total/NA	Prep	3546			10.12 g	5 mL	373702	03/28/19 09:41	EMB	TAL CAN
Total/NA	Analysis	8015D		1			373924	03/29/19 22:29	DEB	TAL CAN
	Instrument ID: A2HP5R									

Client Sample ID: TO-CS-BT-01
Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Lab Sample ID: 180-87908-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			274119	03/27/19 13:33	TAM	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-CS-BT-01
Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Lab Sample ID: 180-87908-2
Matrix: Solid
Percent Solids: 85.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			6.5736 g	5 mL	273901	03/26/19 06:05	PJJ	TAL PIT
Total/NA	Analysis	EPA 8260C		1	0.1 mL	5 mL	273899	03/26/19 13:05	PJJ	TAL PIT
	Instrument ID: CHHP11									
Total/NA	Prep	5035			5.182 g	5 mL	374258	04/02/19 09:25	LKG	TAL CAN
Total/NA	Analysis	8015D		10	0.1 mL	5 mL	374259	04/02/19 13:53	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3546			10.36 g	5 mL	373702	03/28/19 09:41	EMB	TAL CAN
Total/NA	Analysis	8015D		10			374319	04/02/19 20:39	DEB	TAL CAN
	Instrument ID: A2HP5R									

Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87908-1

Analyst References:

Lab: TAL CAN

Batch Type: Prep

EMB = Elizabeth Border

LKG = Lucas Grossman

Batch Type: Analysis

DEB = Deborah Bolgrin

KMG = Katie Grant

LKG = Lucas Grossman

Lab: TAL PIT

Batch Type: Prep

KLG = Kathy Gordon

PJJ = Patrick Journet

Batch Type: Analysis

KLG = Kathy Gordon

PJJ = Patrick Journet

TAM = Tessa Mastalski

Client Sample ID: TO-CS-AK-01

Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Lab Sample ID: 180-87908-1

Matrix: Solid
Percent Solids: 82.2

Method: EPA 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		6.0	2.4	ug/Kg	☼	03/22/19 06:00	03/22/19 09:50	1
Toluene	ND		6.0	2.0	ug/Kg	☼	03/22/19 06:00	03/22/19 09:50	1
Ethylbenzene	ND		6.0	2.6	ug/Kg	☼	03/22/19 06:00	03/22/19 09:50	1
Xylenes, Total	ND		12	5.2	ug/Kg	☼	03/22/19 06:00	03/22/19 09:50	1
m-Xylene & p-Xylene	ND		6.0	2.3	ug/Kg	☼	03/22/19 06:00	03/22/19 09:50	1
o-Xylene	ND		6.0	2.9	ug/Kg	☼	03/22/19 06:00	03/22/19 09:50	1
cis-1,2-Dichloroethene	**2.2**	**J**	6.0	1.9	ug/Kg	☼	03/22/19 06:00	03/22/19 09:50	1
Trichloroethene	**150**		6.0	1.8	ug/Kg	☼	03/22/19 06:00	03/22/19 09:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*84*		*69 - 110*	*03/22/19 06:00*	*03/22/19 09:50*	*1*
4-Bromofluorobenzene (Surr)	*97*		*70 - 110*	*03/22/19 06:00*	*03/22/19 09:50*	*1*
Dibromofluoromethane (Surr)	*90*		*74 - 114*	*03/22/19 06:00*	*03/22/19 09:50*	*1*
Toluene-d8 (Surr)	*105*		*83 - 124*	*03/22/19 06:00*	*03/22/19 09:50*	*1*

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	**240**		100	65	ug/Kg	☼	03/22/19 10:37	03/26/19 12:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*75*		*43 - 120*	*03/22/19 10:37*	*03/26/19 12:59*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	**54**	**J**	60	42	mg/Kg	☼	03/28/19 09:41	03/29/19 22:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*88*		*26 - 125*	*03/28/19 09:41*	*03/29/19 22:29*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**17.8**		0.1	0.1	%			03/27/19 13:33	1
Percent Solids	**82.2**		0.1	0.1	%			03/27/19 13:33	1

Client Sample ID: TO-CS-BT-01

Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Lab Sample ID: 180-87908-2

Matrix: Solid
Percent Solids: 85.4

Method: EPA 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**180**	**J**	270	100	ug/Kg	☼	03/26/19 06:05	03/26/19 13:05	1
Toluene	**530**		270	89	ug/Kg	☼	03/26/19 06:05	03/26/19 13:05	1
Ethylbenzene	**2200**		270	110	ug/Kg	☼	03/26/19 06:05	03/26/19 13:05	1
Xylenes, Total	**8100**	**F1**	530	230	ug/Kg	☼	03/26/19 06:05	03/26/19 13:05	1
m-Xylene & p-Xylene	**5300**	**F1**	270	100	ug/Kg	☼	03/26/19 06:05	03/26/19 13:05	1
o-Xylene	**2900**	**F1**	270	130	ug/Kg	☼	03/26/19 06:05	03/26/19 13:05	1
cis-1,2-Dichloroethene	ND		270	84	ug/Kg	☼	03/26/19 06:05	03/26/19 13:05	1
Trichloroethene	ND		270	80	ug/Kg	☼	03/26/19 06:05	03/26/19 13:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*52 - 135*	*03/26/19 06:05*	*03/26/19 13:05*	*1*

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87908-1

Client Sample ID: TO-CS-BT-01

Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Lab Sample ID: 180-87908-2

Matrix: Solid
Percent Solids: 85.4

Method: EPA 8260C - Volatile Organic Compounds by GC/MS (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*106*		*60 - 127*	*03/26/19 06:05*	*03/26/19 13:05*	*1*
Dibromofluoromethane (Surr)	*91*		*70 - 121*	*03/26/19 06:05*	*03/26/19 13:05*	*1*
Toluene-d8 (Surr)	*108*		*72 - 123*	*03/26/19 06:05*	*03/26/19 13:05*	*1*

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	**720000**		65000	35000	ug/Kg	☼	04/02/19 09:25	04/02/19 13:53	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*208*	*X*	*36 - 157*	*04/02/19 09:25*	*04/02/19 13:53*	*10*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	**2000**		570	390	mg/Kg	☼	03/28/19 09:41	04/02/19 20:39	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*93*		*26 - 125*	*03/28/19 09:41*	*04/02/19 20:39*	*10*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**14.6**		0.1	0.1	%			03/27/19 13:33	1
Percent Solids	**85.4**		0.1	0.1	%			03/27/19 13:33	1

Method: EPA 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 180-273616/7
Matrix: Solid
Analysis Batch: 273616

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0	2.0	ug/Kg			03/22/19 09:03	1
Toluene	ND		5.0	1.7	ug/Kg			03/22/19 09:03	1
Ethylbenzene	ND		5.0	2.2	ug/Kg			03/22/19 09:03	1
Xylenes, Total	ND		10	4.3	ug/Kg			03/22/19 09:03	1
m-Xylene & p-Xylene	ND		5.0	1.9	ug/Kg			03/22/19 09:03	1
o-Xylene	ND		5.0	2.4	ug/Kg			03/22/19 09:03	1
cis-1,2-Dichloroethene	ND		5.0	1.6	ug/Kg			03/22/19 09:03	1
Trichloroethene	ND		5.0	1.5	ug/Kg			03/22/19 09:03	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*69 - 110*		*03/22/19 09:03*	*1*
4-Bromofluorobenzene (Surr)	*97*		*70 - 110*		*03/22/19 09:03*	*1*
Dibromofluoromethane (Surr)	*90*		*74 - 114*		*03/22/19 09:03*	*1*
Toluene-d8 (Surr)	*107*		*83 - 124*		*03/22/19 09:03*	*1*

Lab Sample ID: LCS 180-273616/4
Matrix: Solid
Analysis Batch: 273616

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	40.0	41.3		ug/Kg		103	75 - 121
Toluene	40.0	42.8		ug/Kg		107	79 - 123
Ethylbenzene	40.0	43.4		ug/Kg		109	79 - 120
Xylenes, Total	80.0	83.2		ug/Kg		104	79 - 119
m-Xylene & p-Xylene	40.0	41.4		ug/Kg		104	79 - 119
o-Xylene	40.0	41.8		ug/Kg		104	79 - 119
cis-1,2-Dichloroethene	40.0	39.1		ug/Kg		98	76 - 120
Trichloroethene	40.0	36.8		ug/Kg		92	72 - 122

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*90*		*69 - 110*
4-Bromofluorobenzene (Surr)	*100*		*70 - 110*
Dibromofluoromethane (Surr)	*93*		*74 - 114*
Toluene-d8 (Surr)	*106*		*83 - 124*

Lab Sample ID: LCSD 180-273616/5
Matrix: Solid
Analysis Batch: 273616

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	40.0	45.2		ug/Kg		113	75 - 121	9	20
Toluene	40.0	46.8		ug/Kg		117	79 - 123	9	20
Ethylbenzene	40.0	46.5		ug/Kg		116	79 - 120	7	20
Xylenes, Total	80.0	89.9		ug/Kg		112	79 - 119	8	20
m-Xylene & p-Xylene	40.0	44.9		ug/Kg		112	79 - 119	8	20
o-Xylene	40.0	44.9		ug/Kg		112	79 - 119	7	20
cis-1,2-Dichloroethene	40.0	42.9		ug/Kg		107	76 - 120	9	20
Trichloroethene	40.0	41.7		ug/Kg		104	72 - 122	13	20

Method: EPA 8260C - Volatile Organic Compounds by GC/MS (Continued)

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	93		69 - 110
4-Bromofluorobenzene (Surr)	103		70 - 110
Dibromofluoromethane (Surr)	97		74 - 114
Toluene-d8 (Surr)	107		83 - 124

Lab Sample ID: MB 180-273901/1-A
Matrix: Solid
Analysis Batch: 273899

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 273901

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		250	98	ug/Kg		03/26/19 06:05	03/26/19 11:44	1
Toluene	ND		250	84	ug/Kg		03/26/19 06:05	03/26/19 11:44	1
Ethylbenzene	ND		250	110	ug/Kg		03/26/19 06:05	03/26/19 11:44	1
Xylenes, Total	ND		500	220	ug/Kg		03/26/19 06:05	03/26/19 11:44	1
m-Xylene & p-Xylene	ND		250	94	ug/Kg		03/26/19 06:05	03/26/19 11:44	1
o-Xylene	ND		250	120	ug/Kg		03/26/19 06:05	03/26/19 11:44	1
cis-1,2-Dichloroethene	ND		250	79	ug/Kg		03/26/19 06:05	03/26/19 11:44	1
Trichloroethene	ND		250	75	ug/Kg		03/26/19 06:05	03/26/19 11:44	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	82		52 - 135	03/26/19 06:05	03/26/19 11:44	1
4-Bromofluorobenzene (Surr)	64		60 - 127	03/26/19 06:05	03/26/19 11:44	1
Dibromofluoromethane (Surr)	101		70 - 121	03/26/19 06:05	03/26/19 11:44	1
Toluene-d8 (Surr)	116		72 - 123	03/26/19 06:05	03/26/19 11:44	1

Lab Sample ID: LCS 180-273901/2-A
Matrix: Solid
Analysis Batch: 273899

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 273901

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	2000	1760		ug/Kg		88	76 - 116
Toluene	2000	1860		ug/Kg		93	76 - 126
Ethylbenzene	2000	1760		ug/Kg		88	77 - 119
Xylenes, Total	4000	3580		ug/Kg		89	77 - 117
m-Xylene & p-Xylene	2000	1740		ug/Kg		87	77 - 117
o-Xylene	2000	1840		ug/Kg		92	78 - 118
cis-1,2-Dichloroethene	2000	1620		ug/Kg		81	67 - 116
Trichloroethene	2000	2100		ug/Kg		105	70 - 121

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	73		52 - 135
4-Bromofluorobenzene (Surr)	77		60 - 127
Dibromofluoromethane (Surr)	84		70 - 121
Toluene-d8 (Surr)	91		72 - 123

Lab Sample ID: 180-87908-2 MS
Matrix: Solid
Analysis Batch: 273899

Client Sample ID: TO-CS-BT-01
Prep Type: Total/NA
Prep Batch: 273901

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	180	J	2120	2280		ug/Kg	☼	99	76 - 116

Method: EPA 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 180-87908-2 MS
Matrix: Solid
Analysis Batch: 273899

Client Sample ID: TO-CS-BT-01
Prep Type: Total/NA
Prep Batch: 273901

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Toluene	530		2120	2480		ug/Kg	☼	91	76 - 126
Ethylbenzene	2200		2120	4560		ug/Kg	☼	113	77 - 119
Xylenes, Total	8100	F1	4250	13400	F1	ug/Kg	☼	125	77 - 117
m-Xylene & p-Xylene	5300	F1	2120	8060	F1	ug/Kg	☼	132	77 - 117
o-Xylene	2900	F1	2120	5340		ug/Kg	☼	117	78 - 118
cis-1,2-Dichloroethene	ND		2120	2030		ug/Kg	☼	95	67 - 116
Trichloroethene	ND		2120	2530		ug/Kg	☼	119	70 - 121

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*93*		*52 - 135*
4-Bromofluorobenzene (Surr)	*104*		*60 - 127*
Dibromofluoromethane (Surr)	*105*		*70 - 121*
Toluene-d8 (Surr)	*100*		*72 - 123*

Lab Sample ID: 180-87908-2 MSD
Matrix: Solid
Analysis Batch: 273899

Client Sample ID: TO-CS-BT-01
Prep Type: Total/NA
Prep Batch: 273901

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	180	J	2120	2260		ug/Kg	☼	98	76 - 116	1	15
Toluene	530		2120	2620		ug/Kg	☼	98	76 - 126	6	15
Ethylbenzene	2200		2120	4650		ug/Kg	☼	117	77 - 119	2	17
Xylenes, Total	8100	F1	4250	13800	F1	ug/Kg	☼	134	77 - 117	3	15
m-Xylene & p-Xylene	5300	F1	2120	8230	F1	ug/Kg	☼	140	77 - 117	2	15
o-Xylene	2900	F1	2120	5560	F1	ug/Kg	☼	127	78 - 118	4	15
cis-1,2-Dichloroethene	ND		2120	2090		ug/Kg	☼	98	67 - 116	3	15
Trichloroethene	ND		2120	2510		ug/Kg	☼	118	70 - 121	1	15

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*93*		*52 - 135*
4-Bromofluorobenzene (Surr)	*99*		*60 - 127*
Dibromofluoromethane (Surr)	*106*		*70 - 121*
Toluene-d8 (Surr)	*104*		*72 - 123*

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Lab Sample ID: MB 240-373281/1-A
Matrix: Solid
Analysis Batch: 373284

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 373281

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	64	ug/Kg		03/26/19 08:36	03/26/19 11:43	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*98*		*43 - 120*	*03/26/19 08:36*	*03/26/19 11:43*	*1*

Method: 8015D - Gasoline Range Organics (GRO) (GC) (Continued)

Lab Sample ID: LCS 240-373281/2-A
Matrix: Solid
Analysis Batch: 373284

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 373281

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Gasoline Range Organics [C6 - C10]	800	874		ug/Kg		109	76 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Trifluorotoluene (Surr)	*111*		*43 - 120*

Lab Sample ID: MB 240-374258/1-A
Matrix: Solid
Analysis Batch: 374259

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 374258

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		5000	2700	ug/Kg		04/02/19 09:25	04/02/19 12:35	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*93*		*36 - 157*	*04/02/19 09:25*	*04/02/19 12:35*	*1*

Lab Sample ID: LCS 240-374258/2-A
Matrix: Solid
Analysis Batch: 374259

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 374258

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Gasoline Range Organics [C6 - C10]	40000	47600		ug/Kg		119	65 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Trifluorotoluene (Surr)	*91*		*36 - 157*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Lab Sample ID: MB 240-373702/19-A
Matrix: Solid
Analysis Batch: 373924

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 373702

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		50	35	mg/Kg		03/28/19 09:41	03/29/19 12:45	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*112*		*26 - 125*	*03/28/19 09:41*	*03/29/19 12:45*	*1*

Lab Sample ID: LCS 240-373702/20-A
Matrix: Solid
Analysis Batch: 373924

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 373702

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics [C10 - C28]	250	251		mg/Kg		100	45 - 120

Method: 8015D - Diesel Range Organics (DRO) (GC) (Continued)

Lab Sample ID: LCS 240-373702/20-A
Matrix: Solid
Analysis Batch: 373924

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 373702

Surrogate	LCS %Recovery	LCS Qualifier	Limits
o-Terphenyl	108		26 - 125

QC Association Summary

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87908-1

GC/MS VOA

Analysis Batch: 273616

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87908-1	TO-CS-AK-01	Total/NA	Solid	EPA 8260C	273625
MB 180-273616/7	Method Blank	Total/NA	Solid	EPA 8260C	
LCS 180-273616/4	Lab Control Sample	Total/NA	Solid	EPA 8260C	
LCSD 180-273616/5	Lab Control Sample Dup	Total/NA	Solid	EPA 8260C	

Prep Batch: 273625

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87908-1	TO-CS-AK-01	Total/NA	Solid	5035	

Analysis Batch: 273899

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87908-2	TO-CS-BT-01	Total/NA	Solid	EPA 8260C	273901
MB 180-273901/1-A	Method Blank	Total/NA	Solid	EPA 8260C	273901
LCS 180-273901/2-A	Lab Control Sample	Total/NA	Solid	EPA 8260C	273901
180-87908-2 MS	TO-CS-BT-01	Total/NA	Solid	EPA 8260C	273901
180-87908-2 MSD	TO-CS-BT-01	Total/NA	Solid	EPA 8260C	273901

Prep Batch: 273901

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87908-2	TO-CS-BT-01	Total/NA	Solid	5035	
MB 180-273901/1-A	Method Blank	Total/NA	Solid	5035	
LCS 180-273901/2-A	Lab Control Sample	Total/NA	Solid	5035	
180-87908-2 MS	TO-CS-BT-01	Total/NA	Solid	5035	
180-87908-2 MSD	TO-CS-BT-01	Total/NA	Solid	5035	

GC VOA

Prep Batch: 373281

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87908-1	TO-CS-AK-01	Total/NA	Solid	5035	
MB 240-373281/1-A	Method Blank	Total/NA	Solid	5035	
LCS 240-373281/2-A	Lab Control Sample	Total/NA	Solid	5035	

Analysis Batch: 373284

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87908-1	TO-CS-AK-01	Total/NA	Solid	8015D	373281
MB 240-373281/1-A	Method Blank	Total/NA	Solid	8015D	373281
LCS 240-373281/2-A	Lab Control Sample	Total/NA	Solid	8015D	373281

Prep Batch: 374258

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87908-2	TO-CS-BT-01	Total/NA	Solid	5035	
MB 240-374258/1-A	Method Blank	Total/NA	Solid	5035	
LCS 240-374258/2-A	Lab Control Sample	Total/NA	Solid	5035	

Analysis Batch: 374259

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87908-2	TO-CS-BT-01	Total/NA	Solid	8015D	374258
MB 240-374258/1-A	Method Blank	Total/NA	Solid	8015D	374258
LCS 240-374258/2-A	Lab Control Sample	Total/NA	Solid	8015D	374258

QC Association Summary

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87908-1

GC Semi VOA

Prep Batch: 373702

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87908-1	TO-CS-AK-01	Total/NA	Solid	3546	
180-87908-2	TO-CS-BT-01	Total/NA	Solid	3546	
MB 240-373702/19-A	Method Blank	Total/NA	Solid	3546	
LCS 240-373702/20-A	Lab Control Sample	Total/NA	Solid	3546	

Analysis Batch: 373924

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87908-1	TO-CS-AK-01	Total/NA	Solid	8015D	373702
MB 240-373702/19-A	Method Blank	Total/NA	Solid	8015D	373702
LCS 240-373702/20-A	Lab Control Sample	Total/NA	Solid	8015D	373702

Analysis Batch: 374319

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87908-2	TO-CS-BT-01	Total/NA	Solid	8015D	373702

General Chemistry

Analysis Batch: 274119

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87908-1	TO-CS-AK-01	Total/NA	Solid	2540G	
180-87908-2	TO-CS-BT-01	Total/NA	Solid	2540G	

TestAmerica Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238-2907
phone 412.963.7058 fax 412.963.2468

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Chris Robb	Site Contact: Jule Carr	Date:	COC No:
Geosyntec Consultants	Tel/Fax:	Lab Contact: Carrie Gamber	Carrier:	____ of ____ COCs
10600 N Port Washington Rd #100	Analysis Turnaround Time			Sampler:
Mequon, WI 53092	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
262-834-0232	TAT if different from Below ____			Walk-in Client:
	☑ 2 weeks			Lab Sampling:
Project Name: Time Oil	☐ 1 week			
Site: Time Oil, Seattle	☐ 2 days			Job / SDG No.:
P O # CHE8384	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	8260C (5035) BTEX, Cis 1,2-DCE, TCE	8015D (5035) GRO	8015D (3540C) DRO/ORO	2540G Moisture	1316 - See Notes	Sample Specific Notes:
TO-CS-AK-01	3/20/19	11^00	C	S				X	X	X	X	X	30168
TO-CS-BT-01	3/20/19	11^00	C	S				X	X	X	X	X	30170

TEST ID #

180-87908 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained lo

☐ Return to Client ☑ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments: 1316 analysis to include BTEX, cis-1,2-DCE, TCE, GRO/DRO/ORO analyses

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: ____ Corr'd: ____ Therm ID No.: ____		
Relinquished by:	Company: TEST	Date/Time: 3/20/19 11^00	Received by:	Company: TAPH	Date/Time: 3-21-19 8:35
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.17, dated 4/27/2018

Uncorrected temp 2.7 °C
Thermometer ID 12
CF 0 Initials B

PT-WI-SR-001 effective 11/8/[illegible]

FID 553879 20MAR19 SSIA 553C1/4603/8C8A

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FedEx Express Package US Airbill

FedEx Tracking Number 8146 7597 9034

1 From
Date
Sender's Name
Company T E S T LLC
Address 1874 FORGE ST
Dept/Floor/Suite/Room
City TUCKER State GA ZIP 30084-6628
Phone 770 938-8233

2 Your Internal Billing Reference

3 To
Recipient's Name
Company
Address
We cannot deliver to P.O. Boxes or P.O. ZIP codes.
Dept/Floor/Suite/Room
Address
Use this line for the HOLD location address or for continuation of your shipping address.
City State ZIP
Phone

Hold Weekday
FedEx Ship Center or FedEx Office location REQUIRED. NOT available for FedEx First Overnight.

Hold Saturday
FedEx location address REQUIRED. Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

4 Express Package Service * To most locations.
Packages up to 150 lbs. For packages over 150 lbs., see the FedEx Express Freight US Airbill.

Next Business Day
- FedEx First Overnight — Earliest next business morning delivery to select locations. Friday shipments will be delivered on Monday unless Saturday Delivery is selected.
- FedEx Priority Overnight — Next business morning.* Friday shipments will be delivered on Monday unless Saturday Delivery is selected.
- FedEx Standard Overnight — Next business afternoon.* Saturday Delivery NOT available.

2 or 3 Business Days
- FedEx 2Day A.M. — Second business morning.* Saturday Delivery NOT available.
- FedEx 2Day — Second business afternoon.* Thursday shipments will be delivered on Monday unless Saturday Delivery is selected.
- FedEx Express Saver — Third business day.* Saturday Delivery NOT available.

5 Packaging * Declared value limit $500.
FedEx Envelope* FedEx Pak* FedEx Box FedEx Tube Other

6 Special Handling and Delivery Signature Options Fees may apply. See the FedEx Service Guide.
- Saturday Delivery — NOT available for FedEx Standard Overnight, FedEx 2Day A.M., or FedEx Express Saver.
- No Signature Required — Package may be left without obtaining a signature for delivery.
- Direct Signature — Someone at recipient's address may sign for delivery.
- Indirect Signature — If no one is available at recipient's address, someone at a neighboring address may sign for delivery. For residential deliveries only.

Does this shipment contain dangerous goods?
One box must be checked.
No
Yes — As per attached Shipper's Declaration
Yes — Shipper's Declaration not required
Dry Ice — Dry Ice, 9, UN 1845 ____ kg
Cargo Aircraft Only
Restrictions apply for dangerous goods — see the current FedEx Service Guide.

7 Payment Bill to:
Enter FedEx Acct. No. or Credit Card No. below.
Obtain recip. Acct. No.
Sender — Acct. No. in Section 1 will be billed
Recipient
Third Party
Credit Card
Cash/Check
Total Packages
Total Weight ____ lbs.
Credit Card Auth

Our liability is limited to US$100 unless you declare a higher value. See the current FedEx Service Guide for details.

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8146 7597 9034

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00200 0015

THE LEADER IN ENVIR

Custody

DATE

SIGNATURE

180-87908 Ways

TestAmerica Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone (412) 963-7058 Fax (412) 963-2468

0.6/C0.4

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Gamber, Carrie L	Carrier Tracking No(s):	COC No: 180-357905.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: carrie.gamber@testamericainc.com	State of Origin: Washington	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Washington		Job #: 180-87908-1
Address: 4101 Shuffel Street NW,	Due Date Requested: 4/3/2019			
City: North Canton	TAT Requested (days):			
State, Zip: OH, 44720				
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:			
Email:	WO #:			
Project Name: Time Oil CHE8384	Project #: 18020185			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

EIC

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015D_DRO/3540C (MOD) DRO/ORO	8015D_GRO/5035A_FW GRO terra core kit	8015D_GRO/5035A_FM GRO terra core kit methanol	Total Number of containers	Special Instructions/Note:
Preservation Code:											
TO-CS-AK-01 (180-87908-1)	3/20/19	11:00 Pacific		Solid			X	X	X	3	
TO-CS-BT-01 (180-87908-2)	3/20/19	11:00 Pacific		Solid			X	X	X	3	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		3/21/19 1200	TAPIT		3-22-19 930	TA
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

TestAmerica Canton Sample Receipt Form/Narrative **Login # :** _____
Canton Facility

Client PM Site Name _____ Cooler unpacked by:

Cooler Received on 3-22-19 Opened on 3-22-19

FedEx: 1st Grd (Exp) UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # _____ Foam Box (Client Cooler) Box Other _____

Packing material used: (Bubble Wrap) Foam Plastic Bag None Other _____

COOLANT: (Wet Ice) Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form
   IR GUN# IR-8 (CF **-0.2** °C) Observed Cooler Temp. 0.6 °C Corrected Cooler Temp. 0.4 °C
   IR GUN #36 (CF **+0.7**°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity_____	(Yes)	No		
-Were the seals on the outside of the cooler(s) signed & dated?	(Yes)	No	NA	
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes	(No)		
-Were tamper/custody seals intact and uncompromised?	(Yes)	No	NA	
3. Shippers' packing slip attached to the cooler(s)?	(Yes)	No		
4. Did custody papers accompany the sample(s)?	(Yes)	No		
5. Were the custody papers relinquished & signed in the appropriate place?	(Yes)	No		
6. Was/were the person(s) who collected the samples clearly identified on the COC?	Yes	(No)		
7. Did all bottles arrive in good condition (Unbroken)?	(Yes)	No		
8. Could all bottle labels be reconciled with the COC?	(Yes)	No		
9. Were correct bottle(s) used for the test(s) indicated?	(Yes)	No		
10. Sufficient quantity received to perform indicated analyses?	(Yes)	No		
11. Are these work share samples?	(Yes)	No		
If yes, Questions 12-16 have been checked at the originating laboratory.				
12. Were all preserved sample(s) at the correct pH upon receipt?	Yes	No	NA	pH Strip Lot# **HC861525**
13. Were VOAs on the COC?	Yes	No		
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this.	Yes	No	NA	
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____	Yes	No		
16. Was a LL Hg or Me Hg trip blank present? _____	Yes	No		

Tests that are not checked for pH by Receiving:

VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by:

_____

_____

_____

_____

_____

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.

Sample(s) _____ were received in a broken container.

Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.

Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

TestAmerica Canton Sample Receipt Form/Narrative **Login # :** _____
Canton Facility

Client TA Pittsburg Site Name _____ Cooler unpacked by: MJ

Cooler Received on 3-27-19 Opened on 3-27-19

FedEx: 1st Grd (Exp) UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # TA Foam Box Client Cooler Box Other _____

Packing material used: (Bubble Wrap) Foam (Plastic Bag) None Other _____

COOLANT: (Wet Ice) Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form
   IR GUN# IR-8 (CF **-0.2** °C) Observed Cooler Temp. 2.6 °C Corrected Cooler Temp. 2.4 °C
   IR GUN #36 (CF **+0.7**°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity _____ Yes (No)
   -Were the seals on the outside of the cooler(s) signed & dated? Yes No (NA)
   -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes (No)
   -Were tamper/custody seals intact and uncompromised? (Yes) No NA
3. Shippers' packing slip attached to the cooler(s)? (Yes) No
4. Did custody papers accompany the sample(s)? Yes (No)
5. Were the custody papers relinquished & signed in the appropriate place? Yes (No)
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes (No)
7. Did all bottles arrive in good condition (Unbroken)? (Yes) No
8. Could all bottle labels be reconciled with the COC? Yes (No)
9. Were correct bottle(s) used for the test(s) indicated? (Yes) No
10. Sufficient quantity received to perform indicated analyses? (Yes) No
11. Are these work share samples? (Yes) No
    If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# **HC861525**
13. Were VOAs on the COC? Yes No
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____ Yes No
16. Was a LL Hg or Me Hg trip blank present? _____ Yes No

Tests that are not checked for pH by Receiving:
VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by:

Tc-Cs-BT-01 60 mL unpreserved / 4 oz wide glass unpreserved
Tc-Cs-Ak-01 60 mL unpreserved / 4 oz wide glass unpreserved

C101

18. SAMPLE CONDITION

Sample(s) _____ were receive pired.
Sample(s) _____ ntainer.
Sample(s) _____ were otify PM)

180-87908 Chain of Custody

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

WI-NC-099

Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 180-87908-1

Login Number: 87908
List Number: 1
Creator: Watson, Debbie

List Source: Eurofins TestAmerica, Pittsburgh

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-87910-1
Client Project/Site: Time Oil CHE8384

For:
Geosyntec Consultants, Inc.
1420 Kensington Rd. , Ste. 103
Oak Brook, Illinois 60523

Attn: Jule Carr

Authorized for release by:
4/19/2019 7:34:28 AM

Carrie Gamber, Senior Project Manager
(412)963-2428
carrie.gamber@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

PA Lab ID: 02-00416

Table of Contents

Job ID: 180-87910-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

CASE NARRATIVE

Client: Geosyntec Consultants, Inc.

Project: Time Oil CHE8384

Report Number: 180-87910-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The samples were received on 03/21/2019; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.7 C.

VOLATILES

Internal standard (ISTD) response for TBA-d9 for the following sample was outside acceptance criteria: TO-CS-BT-01 T04 1.0 (180-87910-11). This ISTD does not correspond to any of the requested target compounds; therefore, the data have been reported.

The following samples were diluted to bring the concentration of target analytes within the calibration range: TO-CS-AK-01 T01 10.0 (180-87910-3), TO-CS-AK-01 T02 5.0 (180-87910-4), TO-CS-AK-01 T03 2.0 (180-87910-5), TO-CS-AK-01 T04 1.0 (180-87910-6), TO-CS-AK-01 T05 0.5 (180-87910-7), TO-CS-BT-01 T02 5.0 (180-87910-9), TO-CS-BT-01 T03 2.0 (180-87910-10) and TO-CS-BT-01 T04 1.0 (180-87910-11). Elevated reporting limits (RLs) are provided.

The following volatiles sample was diluted due to foaming at the time of purging during the original sample analysis: TO-CS-BT-01 T05 0.5 (180-87910-12). Elevated reporting limits (RLs) are provided.

8015D DRO

Samples TO-CS-BT-01 T01 10.0 (180-87910-18), TO-CS-BT-01 T02 5.0 (180-87910-19), TO-CS-BT-01 T03 2.0 (180-87910-20), TO-CS-BT-01 T04 1.0 (180-87910-21) and TO-CS-BT-01 T05 0.5 (180-87910-22) required dilution prior to analysis. The reporting limits have been adjusted accordingly.

The following sample required a dilution due to the nature of the sample matrix: TO-CS-BT-01 T01 10.0 (180-87910-18) and TO-CS-BT-01 T04 1.0 (180-87910-21). Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

8015 GRO

ample TO-CS-BT-01 T05 0.5 (180-87910-26) required dilution prior to analysis. The reporting limits have been adjusted accordingly.

GENERAL CHEMSITRY

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87910-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
E	Result exceeded calibration range.

GC VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC Semi VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
X	Surrogate is outside control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc. Job ID: 180-87910-1
Project/Site: Time Oil CHE8384

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arkansas DEQ	State Program	6	88-0690	06-27-19
California	State Program	9	2891	04-30-19 *
Connecticut	State Program	1	PH-0688	09-30-20
Florida	NELAP	4	E871008	06-30-19
Illinois	NELAP	5	200005	06-30-19
Kansas	NELAP	7	E-10350	01-31-20
Louisiana	NELAP	6	04041	06-30-19
Nevada	State Program	9	PA00164	07-31-19
New Hampshire	NELAP	1	2030	04-04-20
New Jersey	NELAP	2	PA005	06-30-19
New York	NELAP	2	11182	03-31-20
North Carolina (WW/SW)	State Program	4	434	12-31-19
Oregon	NELAP	10	PA-2151	02-06-20
Pennsylvania	NELAP	3	02-00416	04-30-19
South Carolina	State Program	4	89014	04-30-19 *
Texas	NELAP	6	T104704528-15-2	03-31-20
US Fish & Wildlife	Federal		LE94312A-1	07-31-19
USDA	Federal		P330-16-00211	06-26-19
Utah	NELAP	8	PA001462015-4	05-31-19 *
Virginia	NELAP	3	460189	09-14-19
West Virginia DEP	State Program	3	142	01-31-20
Wisconsin	State Program	5	998027800	08-31-19

Laboratory: Eurofins TestAmerica, Canton

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Washington	State Program	10	C971	01-12-20 *

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8015D		Water	Gasoline Range Organics [C6 - C10]
8015D	3520C	Water	C10-C34

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87910-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-87910-1	TO-CS-AK-01	Solid	03/20/19 11:00	03/21/19 08:35
180-87910-2	TO-CS-BT-01	Solid	03/20/19 11:00	03/21/19 08:35
180-87910-3	TO-CS-AK-01 T01 10.0	Solid	03/20/19 11:00	03/21/19 08:35
180-87910-4	TO-CS-AK-01 T02 5.0	Solid	03/20/19 11:00	03/21/19 08:35
180-87910-5	TO-CS-AK-01 T03 2.0	Solid	03/20/19 11:00	03/21/19 08:35
180-87910-6	TO-CS-AK-01 T04 1.0	Solid	03/20/19 11:00	03/21/19 08:35
180-87910-7	TO-CS-AK-01 T05 0.5	Solid	03/20/19 11:00	03/21/19 08:35
180-87910-8	TO-CS-BT-01 T01 10.0	Solid	03/20/19 11:00	03/21/19 08:35
180-87910-9	TO-CS-BT-01 T02 5.0	Solid	03/20/19 11:00	03/21/19 08:35
180-87910-10	TO-CS-BT-01 T03 2.0	Solid	03/20/19 11:00	03/21/19 08:35
180-87910-11	TO-CS-BT-01 T04 1.0	Solid	03/20/19 11:00	03/21/19 08:35
180-87910-12	TO-CS-BT-01 T05 0.5	Solid	03/20/19 11:00	03/21/19 08:35
180-87910-13	TO-CS-AK-01 T01 10.0	Water	04/04/19 06:00	03/21/19 08:35
180-87910-14	TO-CS-AK-01 T02 5.0	Water	04/04/19 06:00	03/21/19 08:35
180-87910-15	TO-CS-AK-01 T03 2.0	Water	04/04/19 06:00	03/21/19 08:35
180-87910-16	TO-CS-AK-01 T04 1.0	Water	04/04/19 06:00	03/21/19 08:35
180-87910-17	TO-CS-AK-01 T05 0.5	Water	04/04/19 06:00	03/21/19 08:35
180-87910-18	TO-CS-BT-01 T01 10.0	Water	04/04/19 06:00	03/21/19 08:35
180-87910-19	TO-CS-BT-01 T02 5.0	Water	04/04/19 06:00	03/21/19 08:35
180-87910-20	TO-CS-BT-01 T03 2.0	Water	04/04/19 06:00	03/21/19 08:35
180-87910-21	TO-CS-BT-01 T04 1.0	Water	04/04/19 06:00	03/21/19 08:35
180-87910-22	TO-CS-BT-01 T05 0.5	Water	04/04/19 06:00	03/21/19 08:35
180-87910-23	MB	Solid	03/20/19 11:00	03/21/19 08:35
180-87910-24	MB	Water	04/04/19 06:00	03/21/19 08:35
180-87910-25	TO-CS-AK-01 T05 0.5	Water	04/10/19 05:30	03/21/19 08:35
180-87910-26	TO-CS-BT-01 T05 0.5	Water	04/10/19 05:30	03/21/19 08:35
180-87910-27	MB-1	Water	04/10/19 05:30	03/21/19 08:35

Method Summary

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87910-1

Method	Method Description	Protocol	Laboratory
EPA 8260C	Volatile Organic Compounds (GC/MS)	SW846	TAL PIT
8015D	Gasoline Range Organics (GRO) (GC)	SW846	TAL CAN
8015D	Diesel Range Organics (DRO) (GC)	SW846	TAL CAN
2540G	SM 2540G	SM22	TAL PIT
EPA 9040C	pH	SW846	TAL PIT
SM 2510B	Conductivity, Specific Conductance	SM	TAL PIT
SM 2580B	Reduction-Oxidation (REDOX) Potential	SM	TAL PIT
1316	Liquid-Solid Partitioning as a Function of Liquid-To-Solid Ratio via Parallel	SW846	TAL PIT
3520C	Liquid-Liquid Extraction (Continuous)	SW846	TAL CAN
5030C	Purge and Trap	SW846	TAL CAN
5030C	Purge and Trap	SW846	TAL PIT

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater"

SM22 = Standard Methods For The Examination Of Water And Wastewater, 22nd Edition

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87910-1

Client Sample ID: TO-CS-AK-01
Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Lab Sample ID: 180-87910-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			274119	03/27/19 13:33	TAM	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-CS-BT-01
Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Lab Sample ID: 180-87910-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			274119	03/27/19 13:33	TAM	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-CS-AK-01 T01 10.0
Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Lab Sample ID: 180-87910-3
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1316			92.3 g	780.9 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 8260C		5	5 mL	5 mL	275580	04/12/19 17:16	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1316			92.3 g	780.9 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			274851	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			92.3 g	780.9 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			274855	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			92.3 g	780.9 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			274854	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-CS-AK-01 T02 5.0
Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Lab Sample ID: 180-87910-4
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1316			177.5 g	738.4 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 8260C		10	5 mL	5 mL	275580	04/12/19 16:51	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1316			177.5 g	738.4 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			274851	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			177.5 g	738.4 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			274855	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			177.5 g	738.4 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			274854	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-CS-AK-01 T03 2.0

Lab Sample ID: 180-87910-5

Date Collected: 03/20/19 11:00

Matrix: Solid

Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1316			405 g	639.9 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 8260C		20	5 mL	5 mL	275580	04/12/19 16:26	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1316			405 g	639.9 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			274851	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			405 g	639.9 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			274855	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			405 g	639.9 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			274854	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-CS-AK-01 T04 1.0

Lab Sample ID: 180-87910-6

Date Collected: 03/20/19 11:00

Matrix: Solid

Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1316			966 g	695.5 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 8260C		30	5 mL	5 mL	275580	04/12/19 16:02	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1316			966 g	695.5 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			274851	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			966 g	695.5 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			274855	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			966 g	695.5 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			274854	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-CS-AK-01 T05 0.5

Lab Sample ID: 180-87910-7

Date Collected: 03/20/19 11:00

Matrix: Solid

Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1316			1620.2 g	469.9 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 8260C		50	5 mL	5 mL	275580	04/12/19 15:37	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1316			1620.2 g	469.9 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			274851	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			920.3 g	266.9 mL	275319	04/08/19 08:30	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			275355	04/10/19 10:28	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-CS-AK-01 T05 0.5

Lab Sample ID: 180-87910-7

Date Collected: 03/20/19 11:00

Matrix: Solid

Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1316			1620.2 g	469.9 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			274855	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			1620.2 g	469.9 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			274854	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-CS-BT-01 T01 10.0

Lab Sample ID: 180-87910-8

Date Collected: 03/20/19 11:00

Matrix: Solid

Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1316			92 g	784.4 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	275721	04/15/19 13:53	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1316			92 g	784.4 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			274851	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			92 g	784.4 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			274855	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			92 g	784.4 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			274854	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-CS-BT-01 T02 5.0

Lab Sample ID: 180-87910-9

Date Collected: 03/20/19 11:00

Matrix: Solid

Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1316			177 g	742.7 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	275721	04/15/19 14:59	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1316	DL		177 g	742.7 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 8260C	DL	3	5 mL	5 mL	275721	04/15/19 19:09	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1316			177 g	742.7 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			274851	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			177 g	742.7 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			274855	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			177 g	742.7 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			274854	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87910-1

Client Sample ID: TO-CS-BT-01 T03 2.0

Lab Sample ID: 180-87910-10
Matrix: Solid
Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1316			404 g	645.6 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 8260C		10	5 mL	5 mL	275721	04/15/19 17:29	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1316			404 g	645.6 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			274851	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			404 g	645.6 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			274855	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			404 g	645.6 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			274854	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-CS-BT-01 T04 1.0

Lab Sample ID: 180-87910-11
Matrix: Solid
Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1316			962 g	704.2 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 8260C		20	5 mL	5 mL	275721	04/15/19 16:39	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1316			962 g	704.2 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			274851	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			962 g	704.2 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			274855	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			962 g	704.2 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			274854	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-CS-BT-01 T05 0.5

Lab Sample ID: 180-87910-12
Matrix: Solid
Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1316			1614.4 g	482.7 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 8260C		40	5 mL	5 mL	275721	04/15/19 15:49	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1316			1614.4 g	482.7 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			274851	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			921.6 g	275.6 mL	275319	04/08/19 08:30	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			275355	04/10/19 10:28	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-CS-BT-01 T05 0.5

Lab Sample ID: 180-87910-12

Date Collected: 03/20/19 11:00

Matrix: Solid

Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1316			1614.4 g	482.7 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			274855	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			1614.4 g	482.7 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			274854	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-CS-AK-01 T01 10.0

Lab Sample ID: 180-87910-13

Date Collected: 04/04/19 06:00

Matrix: Water

Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	375523	04/10/19 01:12	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3520C			270 mL	5 mL	375531	04/09/19 11:42	BMB	TAL CAN
Total/NA	Analysis	8015D		1			376107	04/12/19 01:41	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-CS-AK-01 T02 5.0

Lab Sample ID: 180-87910-14

Date Collected: 04/04/19 06:00

Matrix: Water

Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	375523	04/10/19 01:52	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3520C			260 mL	5 mL	375531	04/09/19 11:42	BMB	TAL CAN
Total/NA	Analysis	8015D		1			376107	04/12/19 02:08	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-CS-AK-01 T03 2.0

Lab Sample ID: 180-87910-15

Date Collected: 04/04/19 06:00

Matrix: Water

Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	375523	04/10/19 02:32	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3520C			260 mL	5 mL	375531	04/09/19 11:42	BMB	TAL CAN
Total/NA	Analysis	8015D		1			376107	04/12/19 02:35	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-CS-AK-01 T04 1.0

Lab Sample ID: 180-87910-16
Date Collected: 04/04/19 06:00
Matrix: Water
Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	375523	04/10/19 04:32	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3520C			280 mL	5 mL	375531	04/09/19 11:42	BMB	TAL CAN
Total/NA	Analysis	8015D		1			376107	04/12/19 03:02	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-CS-AK-01 T05 0.5

Lab Sample ID: 180-87910-17
Date Collected: 04/04/19 06:00
Matrix: Water
Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			200 mL	5 mL	375531	04/09/19 11:42	BMB	TAL CAN
Total/NA	Analysis	8015D		1			376107	04/12/19 03:29	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-CS-BT-01 T01 10.0

Lab Sample ID: 180-87910-18
Date Collected: 04/04/19 06:00
Matrix: Water
Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	375523	04/10/19 05:11	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3520C			260 mL	5 mL	375531	04/09/19 11:42	BMB	TAL CAN
Total/NA	Analysis	8015D		5			376318	04/12/19 17:57	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-CS-BT-01 T02 5.0

Lab Sample ID: 180-87910-19
Date Collected: 04/04/19 06:00
Matrix: Water
Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	375523	04/10/19 05:50	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3520C			260 mL	5 mL	375531	04/09/19 11:42	BMB	TAL CAN
Total/NA	Analysis	8015D		2			376318	04/12/19 18:24	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-CS-BT-01 T03 2.0

Lab Sample ID: 180-87910-20
Date Collected: 04/04/19 06:00
Matrix: Water
Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	375523	04/10/19 06:29	LKG	TAL CAN
	Instrument ID: YPID									

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87910-1

Client Sample ID: TO-CS-BT-01 T03 2.0

Lab Sample ID: 180-87910-20
Matrix: Water
Date Collected: 04/04/19 06:00
Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			270 mL	5 mL	375531	04/09/19 11:42	BMB	TAL CAN
Total/NA	Analysis	8015D		5			376318	04/12/19 18:52	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-CS-BT-01 T04 1.0

Lab Sample ID: 180-87910-21
Matrix: Water
Date Collected: 04/04/19 06:00
Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	375523	04/10/19 07:08	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3520C			270 mL	5 mL	375531	04/09/19 11:42	BMB	TAL CAN
Total/NA	Analysis	8015D		500			376318	04/12/19 19:19	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-CS-BT-01 T05 0.5

Lab Sample ID: 180-87910-22
Matrix: Water
Date Collected: 04/04/19 06:00
Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			230 mL	5 mL	375531	04/09/19 11:42	BMB	TAL CAN
Total/NA	Analysis	8015D		100			376318	04/12/19 19:46	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: MB

Lab Sample ID: 180-87910-23
Matrix: Solid
Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1316			1.0 g	1000 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	275580	04/12/19 11:27	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1316			1.0 g	1000 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			274851	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			1.0 g	400.0 mL	275319	04/08/19 08:30	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			275355	04/10/19 10:28	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			1.0 g	1000 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			274855	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1316			1.0 g	1000 mL	274512	04/02/19 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			274854	04/04/19 09:00	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87910-1

Client Sample ID: MB

Lab Sample ID: 180-87910-24
Date Collected: 04/04/19 06:00
Matrix: Water
Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	375523	04/10/19 07:48	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3520C			260 mL	5 mL	375531	04/09/19 11:42	BMB	TAL CAN
Total/NA	Analysis	8015D		1			376107	04/12/19 07:08	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-CS-AK-01 T05 0.5

Lab Sample ID: 180-87910-25
Date Collected: 04/10/19 05:30
Matrix: Water
Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	376230	04/12/19 18:05	LKG	TAL CAN
	Instrument ID: YPID									

Client Sample ID: TO-CS-BT-01 T05 0.5

Lab Sample ID: 180-87910-26
Date Collected: 04/10/19 05:30
Matrix: Water
Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		100	5 mL	5 mL	376727	04/16/19 17:33	LKG	TAL CAN
	Instrument ID: AFID									

Client Sample ID: MB-1

Lab Sample ID: 180-87910-27
Date Collected: 04/10/19 05:30
Matrix: Water
Date Received: 03/21/19 08:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	376456	04/15/19 17:16	LKG	TAL CAN
	Instrument ID: AFID									

Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87910-1

Analyst References:

Lab: TAL CAN

Batch Type: Prep

BMB = Brittany Blythe

Batch Type: Analysis

DEB = Deborah Bolgrin

LKG = Lucas Grossman

Lab: TAL PIT

Batch Type: Leach

LWM = Larry Matko

MTW = Michael Wesoloski

Batch Type: Analysis

MTW = Michael Wesoloski

PJJ = Patrick Journet

TAM = Tessa Mastalski

Client Sample ID: TO-CS-AK-01

Lab Sample ID: 180-87910-1
Date Collected: 03/20/19 11:00
Matrix: Solid
Date Received: 03/21/19 08:35

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14.0		0.1	0.1	%			03/27/19 13:33	1
Percent Solids	86.0		0.1	0.1	%			03/27/19 13:33	1

Client Sample ID: TO-CS-BT-01

Lab Sample ID: 180-87910-2
Date Collected: 03/20/19 11:00
Matrix: Solid
Date Received: 03/21/19 08:35

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	13.4		0.1	0.1	%			03/27/19 13:33	1
Percent Solids	86.6		0.1	0.1	%			03/27/19 13:33	1

Client Sample ID: TO-CS-AK-01 T01 10.0

Lab Sample ID: 180-87910-3
Date Collected: 03/20/19 11:00
Matrix: Solid
Date Received: 03/21/19 08:35

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0	3.0	ug/L			04/12/19 17:16	5
Ethylbenzene	ND		5.0	2.5	ug/L			04/12/19 17:16	5
m-Xylene & p-Xylene	ND		5.0	2.4	ug/L			04/12/19 17:16	5
o-Xylene	ND		5.0	2.0	ug/L			04/12/19 17:16	5
Toluene	ND		5.0	2.3	ug/L			04/12/19 17:16	5
Xylenes, Total	ND		10	4.5	ug/L			04/12/19 17:16	5
cis-1,2-Dichloroethene	ND		5.0	3.5	ug/L			04/12/19 17:16	5
Trichloroethene	99		5.0	3.4	ug/L			04/12/19 17:16	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*65 - 127*		*04/12/19 17:16*	*5*
4-Bromofluorobenzene (Surr)	*83*		*58 - 124*		*04/12/19 17:16*	*5*
Dibromofluoromethane (Surr)	*100*		*64 - 125*		*04/12/19 17:16*	*5*
Toluene-d8 (Surr)	*90*		*69 - 115*		*04/12/19 17:16*	*5*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.7		0.1	0.1	SU			04/04/19 09:00	1
Specific Conductance	56		1.0	1.0	umhos/cm			04/04/19 09:00	1
Oxidation Reduction Potential	530		10	10	millivolts			04/04/19 09:00	1

Client Sample ID: TO-CS-AK-01 T02 5.0

Lab Sample ID: 180-87910-4
Date Collected: 03/20/19 11:00
Matrix: Solid
Date Received: 03/21/19 08:35

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		10	6.0	ug/L			04/12/19 16:51	10
Ethylbenzene	ND		10	5.1	ug/L			04/12/19 16:51	10
m-Xylene & p-Xylene	ND		10	4.8	ug/L			04/12/19 16:51	10
o-Xylene	ND		10	4.1	ug/L			04/12/19 16:51	10
Toluene	ND		10	4.6	ug/L			04/12/19 16:51	10
Xylenes, Total	ND		20	8.9	ug/L			04/12/19 16:51	10

Client Sample ID: TO-CS-AK-01 T02 5.0

Lab Sample ID: 180-87910-4
Matrix: Solid
Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		10	7.1	ug/L			04/12/19 16:51	10
Trichloroethene	**220**		10	6.9	ug/L			04/12/19 16:51	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*65 - 127*		*04/12/19 16:51*	*10*
4-Bromofluorobenzene (Surr)	*92*		*58 - 124*		*04/12/19 16:51*	*10*
Dibromofluoromethane (Surr)	*105*		*64 - 125*		*04/12/19 16:51*	*10*
Toluene-d8 (Surr)	*95*		*69 - 115*		*04/12/19 16:51*	*10*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.7**		0.1	0.1	SU			04/04/19 09:00	1
Specific Conductance	**79**		1.0	1.0	umhos/cm			04/04/19 09:00	1
Oxidation Reduction Potential	**310**		10	10	millivolts			04/04/19 09:00	1

Client Sample ID: TO-CS-AK-01 T03 2.0

Lab Sample ID: 180-87910-5
Matrix: Solid
Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		20	12	ug/L			04/12/19 16:26	20
Ethylbenzene	ND		20	10	ug/L			04/12/19 16:26	20
m-Xylene & p-Xylene	ND		20	9.6	ug/L			04/12/19 16:26	20
o-Xylene	ND		20	8.1	ug/L			04/12/19 16:26	20
Toluene	ND		20	9.1	ug/L			04/12/19 16:26	20
Xylenes, Total	ND		40	18	ug/L			04/12/19 16:26	20
cis-1,2-Dichloroethene	ND		20	14	ug/L			04/12/19 16:26	20
Trichloroethene	**400**		20	14	ug/L			04/12/19 16:26	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*65 - 127*		*04/12/19 16:26*	*20*
4-Bromofluorobenzene (Surr)	*86*		*58 - 124*		*04/12/19 16:26*	*20*
Dibromofluoromethane (Surr)	*101*		*64 - 125*		*04/12/19 16:26*	*20*
Toluene-d8 (Surr)	*94*		*69 - 115*		*04/12/19 16:26*	*20*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.6**		0.1	0.1	SU			04/04/19 09:00	1
Specific Conductance	**180**		1.0	1.0	umhos/cm			04/04/19 09:00	1
Oxidation Reduction Potential	**290**		10	10	millivolts			04/04/19 09:00	1

Client Sample ID: TO-CS-AK-01 T04 1.0

Lab Sample ID: 180-87910-6
Matrix: Solid
Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		30	18	ug/L			04/12/19 16:02	30
Ethylbenzene	ND		30	15	ug/L			04/12/19 16:02	30
m-Xylene & p-Xylene	ND		30	14	ug/L			04/12/19 16:02	30

Client Sample ID: TO-CS-AK-01 T04 1.0

Lab Sample ID: 180-87910-6

Date Collected: 03/20/19 11:00

Matrix: Solid

Date Received: 03/21/19 08:35

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Xylene	ND		30	12	ug/L			04/12/19 16:02	30
Toluene	ND		30	14	ug/L			04/12/19 16:02	30
Xylenes, Total	ND		60	27	ug/L			04/12/19 16:02	30
cis-1,2-Dichloroethene	ND		30	21	ug/L			04/12/19 16:02	30
Trichloroethene	**470**		30	21	ug/L			04/12/19 16:02	30

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*65 - 127*		*04/12/19 16:02*	*30*
4-Bromofluorobenzene (Surr)	*86*		*58 - 124*		*04/12/19 16:02*	*30*
Dibromofluoromethane (Surr)	*103*		*64 - 125*		*04/12/19 16:02*	*30*
Toluene-d8 (Surr)	*89*		*69 - 115*		*04/12/19 16:02*	*30*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.5**		0.1	0.1	SU			04/04/19 09:00	1
Specific Conductance	**240**		1.0	1.0	umhos/cm			04/04/19 09:00	1
Oxidation Reduction Potential	**280**		10	10	millivolts			04/04/19 09:00	1

Client Sample ID: TO-CS-AK-01 T05 0.5

Lab Sample ID: 180-87910-7

Date Collected: 03/20/19 11:00

Matrix: Solid

Date Received: 03/21/19 08:35

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		50	30	ug/L			04/12/19 15:37	50
Ethylbenzene	ND		50	25	ug/L			04/12/19 15:37	50
m-Xylene & p-Xylene	ND		50	24	ug/L			04/12/19 15:37	50
o-Xylene	ND		50	20	ug/L			04/12/19 15:37	50
Toluene	ND		50	23	ug/L			04/12/19 15:37	50
Xylenes, Total	ND		100	45	ug/L			04/12/19 15:37	50
cis-1,2-Dichloroethene	ND		50	35	ug/L			04/12/19 15:37	50
Trichloroethene	**940**		50	34	ug/L			04/12/19 15:37	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*65 - 127*		*04/12/19 15:37*	*50*
4-Bromofluorobenzene (Surr)	*99*		*58 - 124*		*04/12/19 15:37*	*50*
Dibromofluoromethane (Surr)	*115*		*64 - 125*		*04/12/19 15:37*	*50*
Toluene-d8 (Surr)	*108*		*69 - 115*		*04/12/19 15:37*	*50*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.4**		0.1	0.1	SU			04/04/19 09:00	1
pH	**7.4**		0.1	0.1	SU			04/10/19 10:28	1
Specific Conductance	**280**		1.0	1.0	umhos/cm			04/04/19 09:00	1
Oxidation Reduction Potential	**270**		10	10	millivolts			04/04/19 09:00	1

Client Sample ID: TO-CS-BT-01 T01 10.0

Lab Sample ID: 180-87910-8
Matrix: Solid
Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			04/15/19 13:53	1
Ethylbenzene	ND		1.0	0.51	ug/L			04/15/19 13:53	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			04/15/19 13:53	1
o-Xylene	**49**		1.0	0.41	ug/L			04/15/19 13:53	1
Toluene	ND		1.0	0.46	ug/L			04/15/19 13:53	1
Xylenes, Total	**49**		2.0	0.89	ug/L			04/15/19 13:53	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			04/15/19 13:53	1
Trichloroethene	ND		1.0	0.69	ug/L			04/15/19 13:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*82*		*65 - 127*		*04/15/19 13:53*	*1*
4-Bromofluorobenzene (Surr)	*74*		*58 - 124*		*04/15/19 13:53*	*1*
Dibromofluoromethane (Surr)	*90*		*64 - 125*		*04/15/19 13:53*	*1*
Toluene-d8 (Surr)	*85*		*69 - 115*		*04/15/19 13:53*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.5**		0.1	0.1	SU			04/04/19 09:00	1
Specific Conductance	**42**		1.0	1.0	umhos/cm			04/04/19 09:00	1
Oxidation Reduction Potential	**270**		10	10	millivolts			04/04/19 09:00	1

Client Sample ID: TO-CS-BT-01 T02 5.0

Lab Sample ID: 180-87910-9
Matrix: Solid
Date Collected: 03/20/19 11:00
Date Received: 03/21/19 08:35

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			04/15/19 14:59	1
Ethylbenzene	ND		1.0	0.51	ug/L			04/15/19 14:59	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			04/15/19 14:59	1
o-Xylene	**60**	**E**	1.0	0.41	ug/L			04/15/19 14:59	1
Toluene	ND		1.0	0.46	ug/L			04/15/19 14:59	1
Xylenes, Total	**60**	**E**	2.0	0.89	ug/L			04/15/19 14:59	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			04/15/19 14:59	1
Trichloroethene	ND		1.0	0.69	ug/L			04/15/19 14:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*65 - 127*		*04/15/19 14:59*	*1*
4-Bromofluorobenzene (Surr)	*82*		*58 - 124*		*04/15/19 14:59*	*1*
Dibromofluoromethane (Surr)	*100*		*64 - 125*		*04/15/19 14:59*	*1*
Toluene-d8 (Surr)	*95*		*69 - 115*		*04/15/19 14:59*	*1*

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		3.0	1.8	ug/L			04/15/19 19:09	3
Ethylbenzene	ND		3.0	1.5	ug/L			04/15/19 19:09	3
m-Xylene & p-Xylene	ND		3.0	1.4	ug/L			04/15/19 19:09	3
o-Xylene	**67**		3.0	1.2	ug/L			04/15/19 19:09	3
Toluene	ND		3.0	1.4	ug/L			04/15/19 19:09	3
Xylenes, Total	**67**		6.0	2.7	ug/L			04/15/19 19:09	3
cis-1,2-Dichloroethene	ND		3.0	2.1	ug/L			04/15/19 19:09	3

Client Sample ID: TO-CS-BT-01 T02 5.0

Lab Sample ID: 180-87910-9
Date Collected: 03/20/19 11:00
Matrix: Solid
Date Received: 03/21/19 08:35

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach - DL (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	ND		3.0	2.1	ug/L			04/15/19 19:09	3

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*65 - 127*		*04/15/19 19:09*	*3*
4-Bromofluorobenzene (Surr)	*87*		*58 - 124*		*04/15/19 19:09*	*3*
Dibromofluoromethane (Surr)	*102*		*64 - 125*		*04/15/19 19:09*	*3*
Toluene-d8 (Surr)	*103*		*69 - 115*		*04/15/19 19:09*	*3*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.6**		0.1	0.1	SU			04/04/19 09:00	1
Specific Conductance	**69**		1.0	1.0	umhos/cm			04/04/19 09:00	1
Oxidation Reduction Potential	**260**		10	10	millivolts			04/04/19 09:00	1

Client Sample ID: TO-CS-BT-01 T03 2.0

Lab Sample ID: 180-87910-10
Date Collected: 03/20/19 11:00
Matrix: Solid
Date Received: 03/21/19 08:35

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		10	6.0	ug/L			04/15/19 17:29	10
Ethylbenzene	ND		10	5.1	ug/L			04/15/19 17:29	10
m-Xylene & p-Xylene	ND		10	4.8	ug/L			04/15/19 17:29	10
o-Xylene	**120**		10	4.1	ug/L			04/15/19 17:29	10
Toluene	ND		10	4.6	ug/L			04/15/19 17:29	10
Xylenes, Total	**120**		20	8.9	ug/L			04/15/19 17:29	10
cis-1,2-Dichloroethene	ND		10	7.1	ug/L			04/15/19 17:29	10
Trichloroethene	ND		10	6.9	ug/L			04/15/19 17:29	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*65 - 127*		*04/15/19 17:29*	*10*
4-Bromofluorobenzene (Surr)	*89*		*58 - 124*		*04/15/19 17:29*	*10*
Dibromofluoromethane (Surr)	*109*		*64 - 125*		*04/15/19 17:29*	*10*
Toluene-d8 (Surr)	*105*		*69 - 115*		*04/15/19 17:29*	*10*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.5**		0.1	0.1	SU			04/04/19 09:00	1
Specific Conductance	**130**		1.0	1.0	umhos/cm			04/04/19 09:00	1
Oxidation Reduction Potential	**240**		10	10	millivolts			04/04/19 09:00	1

Client Sample ID: TO-CS-BT-01 T04 1.0

Lab Sample ID: 180-87910-11
Date Collected: 03/20/19 11:00
Matrix: Solid
Date Received: 03/21/19 08:35

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		20	12	ug/L			04/15/19 16:39	20
Ethylbenzene	ND		20	10	ug/L			04/15/19 16:39	20
m-Xylene & p-Xylene	ND		20	9.6	ug/L			04/15/19 16:39	20
o-Xylene	**140**		20	8.1	ug/L			04/15/19 16:39	20

Client Sample ID: TO-CS-BT-01 T04 1.0

Lab Sample ID: 180-87910-11

Date Collected: 03/20/19 11:00

Matrix: Solid

Date Received: 03/21/19 08:35

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toluene	ND		20	9.1	ug/L			04/15/19 16:39	20
Xylenes, Total	**140**		40	18	ug/L			04/15/19 16:39	20
cis-1,2-Dichloroethene	ND		20	14	ug/L			04/15/19 16:39	20
Trichloroethene	ND		20	14	ug/L			04/15/19 16:39	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*110*		*65 - 127*		*04/15/19 16:39*	*20*
4-Bromofluorobenzene (Surr)	*99*		*58 - 124*		*04/15/19 16:39*	*20*
Dibromofluoromethane (Surr)	*116*		*64 - 125*		*04/15/19 16:39*	*20*
Toluene-d8 (Surr)	*102*		*69 - 115*		*04/15/19 16:39*	*20*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.5**		0.1	0.1	SU			04/04/19 09:00	1
Specific Conductance	**280**		1.0	1.0	umhos/cm			04/04/19 09:00	1
Oxidation Reduction Potential	**220**		10	10	millivolts			04/04/19 09:00	1

Client Sample ID: TO-CS-BT-01 T05 0.5

Lab Sample ID: 180-87910-12

Date Collected: 03/20/19 11:00

Matrix: Solid

Date Received: 03/21/19 08:35

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		40	24	ug/L			04/15/19 15:49	40
Ethylbenzene	ND		40	20	ug/L			04/15/19 15:49	40
m-Xylene & p-Xylene	ND		40	19	ug/L			04/15/19 15:49	40
o-Xylene	**230**		40	16	ug/L			04/15/19 15:49	40
Toluene	ND		40	18	ug/L			04/15/19 15:49	40
Xylenes, Total	**230**		80	36	ug/L			04/15/19 15:49	40
cis-1,2-Dichloroethene	ND		40	28	ug/L			04/15/19 15:49	40
Trichloroethene	ND		40	28	ug/L			04/15/19 15:49	40

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*65 - 127*		*04/15/19 15:49*	*40*
4-Bromofluorobenzene (Surr)	*84*		*58 - 124*		*04/15/19 15:49*	*40*
Dibromofluoromethane (Surr)	*99*		*64 - 125*		*04/15/19 15:49*	*40*
Toluene-d8 (Surr)	*100*		*69 - 115*		*04/15/19 15:49*	*40*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.6**		0.1	0.1	SU			04/04/19 09:00	1
pH	**7.5**		0.1	0.1	SU			04/10/19 10:28	1
Specific Conductance	**230**		1.0	1.0	umhos/cm			04/04/19 09:00	1
Oxidation Reduction Potential	**230**		10	10	millivolts			04/04/19 09:00	1

Client Sample ID: TO-CS-AK-01 T01 10.0

Lab Sample ID: 180-87910-13
Matrix: Water
Date Collected: 04/04/19 06:00
Date Received: 03/21/19 08:35

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	160		100	49	ug/L			04/10/19 01:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*87*		*56 - 120*		*04/10/19 01:12*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	400	J	460	210	ug/L		04/09/19 11:42	04/12/19 01:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*80*		*37 - 130*	*04/09/19 11:42*	*04/12/19 01:41*	*1*

Client Sample ID: TO-CS-AK-01 T02 5.0

Lab Sample ID: 180-87910-14
Matrix: Water
Date Collected: 04/04/19 06:00
Date Received: 03/21/19 08:35

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	150		100	49	ug/L			04/10/19 01:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*90*		*56 - 120*		*04/10/19 01:52*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	440	J	480	220	ug/L		04/09/19 11:42	04/12/19 02:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*79*		*37 - 130*	*04/09/19 11:42*	*04/12/19 02:08*	*1*

Client Sample ID: TO-CS-AK-01 T03 2.0

Lab Sample ID: 180-87910-15
Matrix: Water
Date Collected: 04/04/19 06:00
Date Received: 03/21/19 08:35

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	220		100	49	ug/L			04/10/19 02:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*93*		*56 - 120*		*04/10/19 02:32*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	600		480	220	ug/L		04/09/19 11:42	04/12/19 02:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*85*		*37 - 130*	*04/09/19 11:42*	*04/12/19 02:35*	*1*

Client Sample ID: TO-CS-AK-01 T04 1.0

Lab Sample ID: 180-87910-16
Matrix: Water
Date Collected: 04/04/19 06:00
Date Received: 03/21/19 08:35

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	250		100	49	ug/L			04/10/19 04:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*70*		*56 - 120*		*04/10/19 04:32*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	2500		450	200	ug/L		04/09/19 11:42	04/12/19 03:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*89*		*37 - 130*	*04/09/19 11:42*	*04/12/19 03:02*	*1*

Client Sample ID: TO-CS-AK-01 T05 0.5

Lab Sample ID: 180-87910-17
Matrix: Water
Date Collected: 04/04/19 06:00
Date Received: 03/21/19 08:35

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	1400		630	280	ug/L		04/09/19 11:42	04/12/19 03:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*88*		*37 - 130*	*04/09/19 11:42*	*04/12/19 03:29*	*1*

Client Sample ID: TO-CS-BT-01 T01 10.0

Lab Sample ID: 180-87910-18
Matrix: Water
Date Collected: 04/04/19 06:00
Date Received: 03/21/19 08:35

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	1200		100	49	ug/L			04/10/19 05:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*95*		*56 - 120*		*04/10/19 05:11*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	10000		2400	1100	ug/L		04/09/19 11:42	04/12/19 17:57	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*21*	*X*	*37 - 130*	*04/09/19 11:42*	*04/12/19 17:57*	*5*

Client Sample ID: TO-CS-BT-01 T02 5.0

Lab Sample ID: 180-87910-19
Matrix: Water
Date Collected: 04/04/19 06:00
Date Received: 03/21/19 08:35

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	1400		100	49	ug/L			04/10/19 05:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*95*		*56 - 120*		*04/10/19 05:50*	*1*

Client Sample ID: TO-CS-BT-01 T02 5.0

Lab Sample ID: 180-87910-19

Date Collected: 04/04/19 06:00

Matrix: Water

Date Received: 03/21/19 08:35

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	7800		960	440	ug/L		04/09/19 11:42	04/12/19 18:24	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*40*		*37 - 130*	*04/09/19 11:42*	*04/12/19 18:24*	*2*

Client Sample ID: TO-CS-BT-01 T03 2.0

Lab Sample ID: 180-87910-20

Date Collected: 04/04/19 06:00

Matrix: Water

Date Received: 03/21/19 08:35

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	1600		100	49	ug/L			04/10/19 06:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*95*		*56 - 120*		*04/10/19 06:29*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	13000		2300	1100	ug/L		04/09/19 11:42	04/12/19 18:52	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*48*		*37 - 130*	*04/09/19 11:42*	*04/12/19 18:52*	*5*

Client Sample ID: TO-CS-BT-01 T04 1.0

Lab Sample ID: 180-87910-21

Date Collected: 04/04/19 06:00

Matrix: Water

Date Received: 03/21/19 08:35

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	2100		100	49	ug/L			04/10/19 07:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*101*		*56 - 120*		*04/10/19 07:08*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	1700000		230000	110000	ug/L		04/09/19 11:42	04/12/19 19:19	500

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*1054*	*X*	*37 - 130*	*04/09/19 11:42*	*04/12/19 19:19*	*500*

Client Sample ID: TO-CS-BT-01 T05 0.5

Lab Sample ID: 180-87910-22

Date Collected: 04/04/19 06:00

Matrix: Water

Date Received: 03/21/19 08:35

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	240000		54000	25000	ug/L		04/09/19 11:42	04/12/19 19:46	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*59*		*37 - 130*	*04/09/19 11:42*	*04/12/19 19:46*	*100*

Client Sample ID: MB

Lab Sample ID: 180-87910-23

Date Collected: 03/20/19 11:00

Matrix: Solid

Date Received: 03/21/19 08:35

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			04/12/19 11:27	1
Ethylbenzene	ND		1.0	0.51	ug/L			04/12/19 11:27	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			04/12/19 11:27	1
o-Xylene	ND		1.0	0.41	ug/L			04/12/19 11:27	1
Toluene	ND		1.0	0.46	ug/L			04/12/19 11:27	1
Xylenes, Total	ND		2.0	0.89	ug/L			04/12/19 11:27	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			04/12/19 11:27	1
Trichloroethene	ND		1.0	0.69	ug/L			04/12/19 11:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*65 - 127*		*04/12/19 11:27*	*1*
4-Bromofluorobenzene (Surr)	*101*		*58 - 124*		*04/12/19 11:27*	*1*
Dibromofluoromethane (Surr)	*114*		*64 - 125*		*04/12/19 11:27*	*1*
Toluene-d8 (Surr)	*108*		*69 - 115*		*04/12/19 11:27*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**5.5**		0.1	0.1	SU			04/04/19 09:00	1
pH	**5.6**		0.1	0.1	SU			04/10/19 10:28	1
Specific Conductance	ND		1.0	1.0	umhos/cm			04/04/19 09:00	1
Oxidation Reduction Potential	**390**		10	10	millivolts			04/04/19 09:00	1

Client Sample ID: MB

Lab Sample ID: 180-87910-24

Date Collected: 04/04/19 06:00

Matrix: Water

Date Received: 03/21/19 08:35

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	**82**	**J**	100	49	ug/L			04/10/19 07:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*93*		*56 - 120*		*04/10/19 07:48*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		480	220	ug/L		04/09/19 11:42	04/12/19 07:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*87*		*37 - 130*	*04/09/19 11:42*	*04/12/19 07:08*	*1*

Client Sample ID: TO-CS-AK-01 T05 0.5

Lab Sample ID: 180-87910-25

Date Collected: 04/10/19 05:30

Matrix: Water

Date Received: 03/21/19 08:35

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	**310**		100	49	ug/L			04/12/19 18:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*115*		*56 - 120*		*04/12/19 18:05*	*1*

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87910-1

Client Sample ID: TO-CS-BT-01 T05 0.5

Lab Sample ID: 180-87910-26

Date Collected: 04/10/19 05:30
Matrix: Water
Date Received: 03/21/19 08:35

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	**250000**		10000	4900	ug/L			04/16/19 17:33	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*101*		*56 - 120*		*04/16/19 17:33*	*100*

Client Sample ID: MB-1

Lab Sample ID: 180-87910-27

Date Collected: 04/10/19 05:30
Matrix: Water
Date Received: 03/21/19 08:35

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			04/15/19 17:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*96*		*56 - 120*		*04/15/19 17:16*	*1*

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87910-1

Method: EPA 8260C - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 180-275580/9
Matrix: Solid
Analysis Batch: 275580

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			04/12/19 10:12	1
Ethylbenzene	ND		1.0	0.51	ug/L			04/12/19 10:12	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			04/12/19 10:12	1
o-Xylene	ND		1.0	0.41	ug/L			04/12/19 10:12	1
Toluene	ND		1.0	0.46	ug/L			04/12/19 10:12	1
Xylenes, Total	ND		2.0	0.89	ug/L			04/12/19 10:12	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			04/12/19 10:12	1
Trichloroethene	ND		1.0	0.69	ug/L			04/12/19 10:12	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*85*		*65 - 127*		*04/12/19 10:12*	*1*
4-Bromofluorobenzene (Surr)	*86*		*58 - 124*		*04/12/19 10:12*	*1*
Dibromofluoromethane (Surr)	*99*		*64 - 125*		*04/12/19 10:12*	*1*
Toluene-d8 (Surr)	*94*		*69 - 115*		*04/12/19 10:12*	*1*

Lab Sample ID: LCS 180-275580/13
Matrix: Solid
Analysis Batch: 275580

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	10.1		ug/L		101	79 - 121
Ethylbenzene	10.0	9.76		ug/L		98	71 - 120
m-Xylene & p-Xylene	10.0	10.3		ug/L		103	72 - 119
o-Xylene	10.0	9.95		ug/L		99	64 - 121
Toluene	10.0	9.77		ug/L		98	76 - 136
Xylenes, Total	20.0	20.2		ug/L		101	69 - 119
cis-1,2-Dichloroethene	10.0	10.6		ug/L		106	76 - 117
Trichloroethene	10.0	10.7		ug/L		107	71 - 121

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*112*		*65 - 127*
4-Bromofluorobenzene (Surr)	*108*		*58 - 124*
Dibromofluoromethane (Surr)	*124*		*64 - 125*
Toluene-d8 (Surr)	*114*		*69 - 115*

Lab Sample ID: MB 180-275721/7
Matrix: Solid
Analysis Batch: 275721

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			04/15/19 10:33	1
Ethylbenzene	ND		1.0	0.51	ug/L			04/15/19 10:33	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			04/15/19 10:33	1
o-Xylene	ND		1.0	0.41	ug/L			04/15/19 10:33	1
Toluene	ND		1.0	0.46	ug/L			04/15/19 10:33	1
Xylenes, Total	ND		2.0	0.89	ug/L			04/15/19 10:33	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			04/15/19 10:33	1
Trichloroethene	ND		1.0	0.69	ug/L			04/15/19 10:33	1

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		65 - 127		04/15/19 10:33	1
4-Bromofluorobenzene (Surr)	91		58 - 124		04/15/19 10:33	1
Dibromofluoromethane (Surr)	110		64 - 125		04/15/19 10:33	1
Toluene-d8 (Surr)	97		69 - 115		04/15/19 10:33	1

Lab Sample ID: LCS 180-275721/5
Matrix: Solid
Analysis Batch: 275721

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	8.99		ug/L		90	79 - 121
Ethylbenzene	10.0	8.87		ug/L		89	71 - 120
m-Xylene & p-Xylene	10.0	9.04		ug/L		90	72 - 119
o-Xylene	10.0	9.18		ug/L		92	64 - 121
Toluene	10.0	9.05		ug/L		91	76 - 136
Xylenes, Total	20.0	18.2		ug/L		91	69 - 119
cis-1,2-Dichloroethene	10.0	9.40		ug/L		94	76 - 117
Trichloroethene	10.0	9.68		ug/L		97	71 - 121

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	83		65 - 127
4-Bromofluorobenzene (Surr)	79		58 - 124
Dibromofluoromethane (Surr)	91		64 - 125
Toluene-d8 (Surr)	83		69 - 115

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Lab Sample ID: MB 240-375523/3
Matrix: Water
Analysis Batch: 375523

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			04/09/19 19:13	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	91		56 - 120		04/09/19 19:13	1

Lab Sample ID: LCS 240-375523/4
Matrix: Water
Analysis Batch: 375523

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Gasoline Range Organics [C6 - C10]	800	804		ug/L		101	73 - 120

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Trifluorotoluene (Surr)	87		56 - 120

Method: 8015D - Gasoline Range Organics (GRO) (GC) (Continued)

Lab Sample ID: MB 240-376230/3
Matrix: Water
Analysis Batch: 376230

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			04/12/19 16:44	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*100*		*56 - 120*		*04/12/19 16:44*	*1*

Lab Sample ID: LCS 240-376230/4
Matrix: Water
Analysis Batch: 376230

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Gasoline Range Organics [C6 - C10]			800	886		ug/L		111	73 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Trifluorotoluene (Surr)	*99*		*56 - 120*

Lab Sample ID: MB 240-376456/9
Matrix: Water
Analysis Batch: 376456

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			04/15/19 15:24	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*97*		*56 - 120*		*04/15/19 15:24*	*1*

Lab Sample ID: LCS 240-376456/10
Matrix: Water
Analysis Batch: 376456

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Gasoline Range Organics [C6 - C10]			800	713		ug/L		89	73 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Trifluorotoluene (Surr)	*104*		*56 - 120*

Lab Sample ID: MB 240-376727/4
Matrix: Water
Analysis Batch: 376727

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			04/16/19 15:40	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*95*		*56 - 120*		*04/16/19 15:40*	*1*

Method: 8015D - Gasoline Range Organics (GRO) (GC) (Continued)

Lab Sample ID: LCS 240-376727/5
Matrix: Water
Analysis Batch: 376727

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Gasoline Range Organics [C6 - C10]	800	683		ug/L		85	73 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Trifluorotoluene (Surr)	*106*		*56 - 120*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Lab Sample ID: MB 240-375531/14-A
Matrix: Water
Analysis Batch: 376107

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 375531

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		500	230	ug/L		04/09/19 11:42	04/11/19 23:52	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*88*		*37 - 130*	*04/09/19 11:42*	*04/11/19 23:52*	*1*

Lab Sample ID: LCS 240-375531/15-A
Matrix: Water
Analysis Batch: 376107

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 375531

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics [C10 - C28]	2000	1710		ug/L		86	56 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl	*86*		*37 - 130*

Method: EPA 9040C - pH

Lab Sample ID: LCS 180-274851/1
Matrix: Solid
Analysis Batch: 274851

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

Lab Sample ID: LCS 180-275355/1
Matrix: Solid
Analysis Batch: 275355

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

Method: EPA 9040C - pH (Continued)

Lab Sample ID: 180-87910-3 DU
Matrix: Solid
Analysis Batch: 274851

Client Sample ID: TO-CS-AK-01 T01 10.0
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH	7.7			7.8		SU				0.1	2

Lab Sample ID: 180-87910-12 DU
Matrix: Solid
Analysis Batch: 274851

Client Sample ID: TO-CS-BT-01 T05 0.5
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH	7.6			7.5		SU				0.1	2

Lab Sample ID: 180-87910-7 DU
Matrix: Solid
Analysis Batch: 275355

Client Sample ID: TO-CS-AK-01 T05 0.5
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH	7.4			7.4		SU				0.1	2

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 180-274855/2
Matrix: Solid
Analysis Batch: 274855

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			04/04/19 09:00	1

Lab Sample ID: LCS 180-274855/1
Matrix: Solid
Analysis Batch: 274855

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Specific Conductance			84.0	86.7		umhos/cm		103	90 - 110		

Lab Sample ID: 180-87910-3 DU
Matrix: Solid
Analysis Batch: 274855

Client Sample ID: TO-CS-AK-01 T01 10.0
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Specific Conductance	56			56.4		umhos/cm				0.09	20

Lab Sample ID: 180-87910-12 DU
Matrix: Solid
Analysis Batch: 274855

Client Sample ID: TO-CS-BT-01 T05 0.5
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Specific Conductance	230			227		umhos/cm				0.1	20

Method: SM 2580B - Reduction-Oxidation (REDOX) Potential

Lab Sample ID: LCS 180-274854/1
Matrix: Solid
Analysis Batch: 274854

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Oxidation Reduction Potential			475	472		millivolts		99	90 - 110		

Lab Sample ID: 180-87910-3 DU
Matrix: Solid
Analysis Batch: 274854

Client Sample ID: TO-CS-AK-01 T01 10.0
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Oxidation Reduction Potential	530			531		millivolts				0.4	20

Lab Sample ID: 180-87910-12 DU
Matrix: Solid
Analysis Batch: 274854

Client Sample ID: TO-CS-BT-01 T05 0.5
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Oxidation Reduction Potential	230			227		millivolts				0.9	20

GC/MS VOA

Leach Batch: 274512

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-3	TO-CS-AK-01 T01 10.0	Leach	Solid	1316	
180-87910-4	TO-CS-AK-01 T02 5.0	Leach	Solid	1316	
180-87910-5	TO-CS-AK-01 T03 2.0	Leach	Solid	1316	
180-87910-6	TO-CS-AK-01 T04 1.0	Leach	Solid	1316	
180-87910-7	TO-CS-AK-01 T05 0.5	Leach	Solid	1316	
180-87910-8	TO-CS-BT-01 T01 10.0	Leach	Solid	1316	
180-87910-9 - DL	TO-CS-BT-01 T02 5.0	Leach	Solid	1316	
180-87910-9	TO-CS-BT-01 T02 5.0	Leach	Solid	1316	
180-87910-10	TO-CS-BT-01 T03 2.0	Leach	Solid	1316	
180-87910-11	TO-CS-BT-01 T04 1.0	Leach	Solid	1316	
180-87910-12	TO-CS-BT-01 T05 0.5	Leach	Solid	1316	
180-87910-23	MB	Leach	Solid	1316	

Analysis Batch: 275580

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-3	TO-CS-AK-01 T01 10.0	Leach	Solid	EPA 8260C	274512
180-87910-4	TO-CS-AK-01 T02 5.0	Leach	Solid	EPA 8260C	274512
180-87910-5	TO-CS-AK-01 T03 2.0	Leach	Solid	EPA 8260C	274512
180-87910-6	TO-CS-AK-01 T04 1.0	Leach	Solid	EPA 8260C	274512
180-87910-7	TO-CS-AK-01 T05 0.5	Leach	Solid	EPA 8260C	274512
180-87910-23	MB	Leach	Solid	EPA 8260C	274512
MB 180-275580/9	Method Blank	Total/NA	Solid	EPA 8260C	
LCS 180-275580/13	Lab Control Sample	Total/NA	Solid	EPA 8260C	

Analysis Batch: 275721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-8	TO-CS-BT-01 T01 10.0	Leach	Solid	EPA 8260C	274512
180-87910-9	TO-CS-BT-01 T02 5.0	Leach	Solid	EPA 8260C	274512
180-87910-9 - DL	TO-CS-BT-01 T02 5.0	Leach	Solid	EPA 8260C	274512
180-87910-10	TO-CS-BT-01 T03 2.0	Leach	Solid	EPA 8260C	274512
180-87910-11	TO-CS-BT-01 T04 1.0	Leach	Solid	EPA 8260C	274512
180-87910-12	TO-CS-BT-01 T05 0.5	Leach	Solid	EPA 8260C	274512
MB 180-275721/7	Method Blank	Total/NA	Solid	EPA 8260C	
LCS 180-275721/5	Lab Control Sample	Total/NA	Solid	EPA 8260C	

GC VOA

Analysis Batch: 375523

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-13	TO-CS-AK-01 T01 10.0	Total/NA	Water	8015D	
180-87910-14	TO-CS-AK-01 T02 5.0	Total/NA	Water	8015D	
180-87910-15	TO-CS-AK-01 T03 2.0	Total/NA	Water	8015D	
180-87910-16	TO-CS-AK-01 T04 1.0	Total/NA	Water	8015D	
180-87910-18	TO-CS-BT-01 T01 10.0	Total/NA	Water	8015D	
180-87910-19	TO-CS-BT-01 T02 5.0	Total/NA	Water	8015D	
180-87910-20	TO-CS-BT-01 T03 2.0	Total/NA	Water	8015D	
180-87910-21	TO-CS-BT-01 T04 1.0	Total/NA	Water	8015D	
180-87910-24	MB	Total/NA	Water	8015D	
MB 240-375523/3	Method Blank	Total/NA	Water	8015D	
LCS 240-375523/4	Lab Control Sample	Total/NA	Water	8015D	

QC Association Summary

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-87910-1

GC VOA

Analysis Batch: 376230

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-25	TO-CS-AK-01 T05 0.5	Total/NA	Water	8015D	
MB 240-376230/3	Method Blank	Total/NA	Water	8015D	
LCS 240-376230/4	Lab Control Sample	Total/NA	Water	8015D	

Analysis Batch: 376456

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-27	MB-1	Total/NA	Water	8015D	
MB 240-376456/9	Method Blank	Total/NA	Water	8015D	
LCS 240-376456/10	Lab Control Sample	Total/NA	Water	8015D	

Analysis Batch: 376727

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-26	TO-CS-BT-01 T05 0.5	Total/NA	Water	8015D	
MB 240-376727/4	Method Blank	Total/NA	Water	8015D	
LCS 240-376727/5	Lab Control Sample	Total/NA	Water	8015D	

GC Semi VOA

Prep Batch: 375531

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-13	TO-CS-AK-01 T01 10.0	Total/NA	Water	3520C	
180-87910-14	TO-CS-AK-01 T02 5.0	Total/NA	Water	3520C	
180-87910-15	TO-CS-AK-01 T03 2.0	Total/NA	Water	3520C	
180-87910-16	TO-CS-AK-01 T04 1.0	Total/NA	Water	3520C	
180-87910-17	TO-CS-AK-01 T05 0.5	Total/NA	Water	3520C	
180-87910-18	TO-CS-BT-01 T01 10.0	Total/NA	Water	3520C	
180-87910-19	TO-CS-BT-01 T02 5.0	Total/NA	Water	3520C	
180-87910-20	TO-CS-BT-01 T03 2.0	Total/NA	Water	3520C	
180-87910-21	TO-CS-BT-01 T04 1.0	Total/NA	Water	3520C	
180-87910-22	TO-CS-BT-01 T05 0.5	Total/NA	Water	3520C	
180-87910-24	MB	Total/NA	Water	3520C	
MB 240-375531/14-A	Method Blank	Total/NA	Water	3520C	
LCS 240-375531/15-A	Lab Control Sample	Total/NA	Water	3520C	

Analysis Batch: 376107

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-13	TO-CS-AK-01 T01 10.0	Total/NA	Water	8015D	375531
180-87910-14	TO-CS-AK-01 T02 5.0	Total/NA	Water	8015D	375531
180-87910-15	TO-CS-AK-01 T03 2.0	Total/NA	Water	8015D	375531
180-87910-16	TO-CS-AK-01 T04 1.0	Total/NA	Water	8015D	375531
180-87910-17	TO-CS-AK-01 T05 0.5	Total/NA	Water	8015D	375531
180-87910-24	MB	Total/NA	Water	8015D	375531
MB 240-375531/14-A	Method Blank	Total/NA	Water	8015D	375531
LCS 240-375531/15-A	Lab Control Sample	Total/NA	Water	8015D	375531

Analysis Batch: 376318

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-18	TO-CS-BT-01 T01 10.0	Total/NA	Water	8015D	375531
180-87910-19	TO-CS-BT-01 T02 5.0	Total/NA	Water	8015D	375531
180-87910-20	TO-CS-BT-01 T03 2.0	Total/NA	Water	8015D	375531
180-87910-21	TO-CS-BT-01 T04 1.0	Total/NA	Water	8015D	375531

GC Semi VOA (Continued)

Analysis Batch: 376318 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-22	TO-CS-BT-01 T05 0.5	Total/NA	Water	8015D	375531

General Chemistry

Analysis Batch: 274119

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-1	TO-CS-AK-01	Total/NA	Solid	2540G	
180-87910-2	TO-CS-BT-01	Total/NA	Solid	2540G	

Leach Batch: 274512

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-3	TO-CS-AK-01 T01 10.0	Leach	Solid	1316	
180-87910-4	TO-CS-AK-01 T02 5.0	Leach	Solid	1316	
180-87910-5	TO-CS-AK-01 T03 2.0	Leach	Solid	1316	
180-87910-6	TO-CS-AK-01 T04 1.0	Leach	Solid	1316	
180-87910-7	TO-CS-AK-01 T05 0.5	Leach	Solid	1316	
180-87910-8	TO-CS-BT-01 T01 10.0	Leach	Solid	1316	
180-87910-9	TO-CS-BT-01 T02 5.0	Leach	Solid	1316	
180-87910-10	TO-CS-BT-01 T03 2.0	Leach	Solid	1316	
180-87910-11	TO-CS-BT-01 T04 1.0	Leach	Solid	1316	
180-87910-12	TO-CS-BT-01 T05 0.5	Leach	Solid	1316	
180-87910-23	MB	Leach	Solid	1316	
180-87910-3 DU	TO-CS-AK-01 T01 10.0	Leach	Solid	1316	
180-87910-12 DU	TO-CS-BT-01 T05 0.5	Leach	Solid	1316	

Analysis Batch: 274851

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-3	TO-CS-AK-01 T01 10.0	Leach	Solid	EPA 9040C	274512
180-87910-4	TO-CS-AK-01 T02 5.0	Leach	Solid	EPA 9040C	274512
180-87910-5	TO-CS-AK-01 T03 2.0	Leach	Solid	EPA 9040C	274512
180-87910-6	TO-CS-AK-01 T04 1.0	Leach	Solid	EPA 9040C	274512
180-87910-7	TO-CS-AK-01 T05 0.5	Leach	Solid	EPA 9040C	274512
180-87910-8	TO-CS-BT-01 T01 10.0	Leach	Solid	EPA 9040C	274512
180-87910-9	TO-CS-BT-01 T02 5.0	Leach	Solid	EPA 9040C	274512
180-87910-10	TO-CS-BT-01 T03 2.0	Leach	Solid	EPA 9040C	274512
180-87910-11	TO-CS-BT-01 T04 1.0	Leach	Solid	EPA 9040C	274512
180-87910-12	TO-CS-BT-01 T05 0.5	Leach	Solid	EPA 9040C	274512
180-87910-23	MB	Leach	Solid	EPA 9040C	274512
LCS 180-274851/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	
180-87910-3 DU	TO-CS-AK-01 T01 10.0	Leach	Solid	EPA 9040C	274512
180-87910-12 DU	TO-CS-BT-01 T05 0.5	Leach	Solid	EPA 9040C	274512

Analysis Batch: 274854

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-3	TO-CS-AK-01 T01 10.0	Leach	Solid	SM 2580B	274512
180-87910-4	TO-CS-AK-01 T02 5.0	Leach	Solid	SM 2580B	274512
180-87910-5	TO-CS-AK-01 T03 2.0	Leach	Solid	SM 2580B	274512
180-87910-6	TO-CS-AK-01 T04 1.0	Leach	Solid	SM 2580B	274512
180-87910-7	TO-CS-AK-01 T05 0.5	Leach	Solid	SM 2580B	274512
180-87910-8	TO-CS-BT-01 T01 10.0	Leach	Solid	SM 2580B	274512
180-87910-9	TO-CS-BT-01 T02 5.0	Leach	Solid	SM 2580B	274512

General Chemistry (Continued)

Analysis Batch: 274854 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-10	TO-CS-BT-01 T03 2.0	Leach	Solid	SM 2580B	274512
180-87910-11	TO-CS-BT-01 T04 1.0	Leach	Solid	SM 2580B	274512
180-87910-12	TO-CS-BT-01 T05 0.5	Leach	Solid	SM 2580B	274512
180-87910-23	MB	Leach	Solid	SM 2580B	274512
LCS 180-274854/1	Lab Control Sample	Total/NA	Solid	SM 2580B	
180-87910-3 DU	TO-CS-AK-01 T01 10.0	Leach	Solid	SM 2580B	274512
180-87910-12 DU	TO-CS-BT-01 T05 0.5	Leach	Solid	SM 2580B	274512

Analysis Batch: 274855

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-3	TO-CS-AK-01 T01 10.0	Leach	Solid	SM 2510B	274512
180-87910-4	TO-CS-AK-01 T02 5.0	Leach	Solid	SM 2510B	274512
180-87910-5	TO-CS-AK-01 T03 2.0	Leach	Solid	SM 2510B	274512
180-87910-6	TO-CS-AK-01 T04 1.0	Leach	Solid	SM 2510B	274512
180-87910-7	TO-CS-AK-01 T05 0.5	Leach	Solid	SM 2510B	274512
180-87910-8	TO-CS-BT-01 T01 10.0	Leach	Solid	SM 2510B	274512
180-87910-9	TO-CS-BT-01 T02 5.0	Leach	Solid	SM 2510B	274512
180-87910-10	TO-CS-BT-01 T03 2.0	Leach	Solid	SM 2510B	274512
180-87910-11	TO-CS-BT-01 T04 1.0	Leach	Solid	SM 2510B	274512
180-87910-12	TO-CS-BT-01 T05 0.5	Leach	Solid	SM 2510B	274512
180-87910-23	MB	Leach	Solid	SM 2510B	274512
MB 180-274855/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-274855/1	Lab Control Sample	Total/NA	Solid	SM 2510B	
180-87910-3 DU	TO-CS-AK-01 T01 10.0	Leach	Solid	SM 2510B	274512
180-87910-12 DU	TO-CS-BT-01 T05 0.5	Leach	Solid	SM 2510B	274512

Leach Batch: 275319

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-7	TO-CS-AK-01 T05 0.5	Leach	Solid	1316	
180-87910-12	TO-CS-BT-01 T05 0.5	Leach	Solid	1316	
180-87910-23	MB	Leach	Solid	1316	
180-87910-7 DU	TO-CS-AK-01 T05 0.5	Leach	Solid	1316	

Analysis Batch: 275355

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-87910-7	TO-CS-AK-01 T05 0.5	Leach	Solid	EPA 9040C	275319
180-87910-12	TO-CS-BT-01 T05 0.5	Leach	Solid	EPA 9040C	275319
180-87910-23	MB	Leach	Solid	EPA 9040C	275319
LCS 180-275355/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	
180-87910-7 DU	TO-CS-AK-01 T05 0.5	Leach	Solid	EPA 9040C	275319

TestAmerica Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238-2907
phone 412.963.7058 fax 412.963.2468

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Chris Robb	Site Contact: Jule Carr	Date:	COC No:
Geosyntec Consultants	Tel/Fax:	Lab Contact: Carrie Gamber	Carrier:	____ of ____ COCs
10600 N Port Washington Rd #100	**Analysis Turnaround Time**			Sampler:
Mequon, WI 53092	☐ CALENDAR DAYS ☐ WORKING DAYS			**For Lab Use Only:**
262-834-0232	TAT if different from Below ____			Walk-in Client:
	☑ 2 weeks			Lab Sampling:
Project Name: Time Oil	☐ 1 week			
Site: Time Oil, Seattle	☐ 2 days			Job / SDG No.:
P O # CHE8384	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	8260C (5035) BTEX, Cis 1,2-DCE, TCE	8015D (5035) GRO	8015D (3540C) DRO/ORO	2540G Moisture	1316 - See Notes	TEST ID # / Sample Specific Notes:
TO-CS-AK-01	3/20/19	11:00	C	S				X	X	X	X	X	30168
TO-CS-BT-01	3/20/19	11:00	C	S				X	X	X	X	X	30170

180-87910 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☑ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments: 1316 analysis to include BTEX, cis-1,2-DCE, TCE, GRO/DRO/ORO analyses

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: ____ Corr'd: ____ | Therm ID No.: ____

	Company	Date/Time		Company	Date/Time
Relinquished by:	TEST	3/20/19 11:00	Received by: Willie Watson	TAPH	3-21-19 8:35
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.17, dated 4/27/2018

NA-AGCA
Uncorrected temp 2.7 °C
Thermometer ID CF 0 12
Initials
PT-WI-SR-001 effective 11/8/
FID 553879 20MAR19 SS1A 553C1/4603/4C8A
PRIORITY
FedEx Express
Package
US Airbill
8146 7597 9034
1 From
Date 2/22/19
Sender's Name
Company TESTING LLC
Address 1274 FORGE ST
City TUCKER
Phone 770 938-8233
2 Your Internal Billing Reference
3 To
Recipient's Name
Company
Address
City
State GA ZIP 30084-6628
Phone
4 Express Package Service
Next Business Day
2 or 3 Business Days
FedEx First Overnight
FedEx Priority Overnight
FedEx Standard Overnight
FedEx 2Day A.M.
FedEx 2Day
FedEx Express Saver
FedEx Box
FedEx Tube
Other
5 Packaging
FedEx Envelope*
FedEx Pak*
6 Special Handling and Delivery Signature Options
Saturday Delivery
No Signature Required
Does this shipment contain dangerous goods?
One box must be checked.
No
Yes
Direct Signature
Indirect Signature
Dry Ice
Cargo Aircraft Only
7 Payment Bill to:
Sender
Recipient
Third Party
Credit Card
Cash/Check
Total Packages 1
Total Weight
Hold Weekday
Hold Saturday
0132941330
8146 7597 9034
180-87910 Waybill
fedex.com 1800.Gofedex 1800.463.3339
Custody
DATE 03
SIGNATURE

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone (412) 963-7058 Fax (412) 963-2468

3.8/3.6 1.0/0.8

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Gamber, Carrie L	Carrier Tracking No(s):	COC No: 180-359123.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: carrie.gamber@testamericainc.com	State of Origin: Washington	Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Washington		Job #: 180-87910-1
Address: 4101 Shuffel Street NW,	Due Date Requested: 5/2/2019			
City: North Canton	TAT Requested (days):			
State, Zip: OH, 44720				
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:			
Email:	WO #:			
Project Name: Time Oil CHE8384	Project #: 18020185			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

GC, C116

Special Instructions/Note:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Wwater, Ssolid, Owaste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015D_DRO/3520C_LVI (MOD) DRO/ORO LVI 1316	8015D_GRO/5030C Gasoline Range Organics [C6-C10]	Total Number of containers
			Preservation Code:						
TO-CS-AK-01 T01 10.0 (180-87910-13)	4/4/19	06:00 Pacific		Water			X	X	3
TO-CS-AK-01 T02 5.0 (180-87910-14)	4/4/19	06:00 Pacific		Water			X	X	3
TO-CS-AK-01 T03 2.0 (180-87910-15)	4/4/19	06:00 Pacific		Water			X	X	3
TO-CS-AK-01 T04 1.0 (180-87910-16)	4/4/19	06:00 Pacific		Water			X	X	3
TO-CS-AK-01 T05 0.5 (180-87910-17)	4/4/19	06:00 Pacific		Water			X		1
TO-CS-BT-01 T01 10.0 (180-87910-18)	4/4/19	06:00 Pacific		Water			X	X	3
TO-CS-BT-01 T02 5.0 (180-87910-19)	4/4/19	06:00 Pacific		Water			X	X	3
TO-CS-BT-01 T03 2.0 (180-87910-20)	4/4/19	06:00 Pacific		Water			X	X	3
TO-CS-BT-01 T04 1.0 (180-87910-21)	4/4/19	06:00 Pacific		Water			X	X	3

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
		4/4/19 1700	TA		4-5-19 1025	TA
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

4/19/2019

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone (412) 963-7058 Fax (412) 963-2468

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Gamber, Carrie L	Carrier Tracking No(s):	COC No: 180-359123.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: carrie.gamber@testamericainc.com	State of Origin: Washington	Page: Page 2 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Washington		Job #: 180-87910-1
Address: 4101 Shuffel Street NW, ,	Due Date Requested: 5/2/2019			
City: North Canton	TAT Requested (days):			
State, Zip: OH, 44720				
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:			
Email:	WO #:			
Project Name: Time Oil CHE8384	Project #: 18020185			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Wwater, Ssolid, Owaste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015D_DRO/3520C_LVI (MOD) DRO/ORO LVI 1316	8015D_GRO/5030C Gasoline Range Organics (C6-C10)	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
TO-CS-BT-01 T05 0.5 (180-87910-22)	4/4/19	06:00 Pacific		Water			X		1	
MB (180-87910-24)	4/4/19	06:00 Pacific		Water			X	X	3	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time	Company	Received by	Date/Time	Company
Relinquished by:	4/4/19 1700	TA		4-5-19 1025	TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Login # : _______________

TestAmerica Canton Sample Receipt Multiple Cooler Form

Cooler Description (Circle)	IR Gun # (Circle)	Observed Temp °C	Corrected Temp °C	Coolant (Circle)
TA (circled) Client Box Other	IR-8 #36	3.8	3.6	Wet Ice (circled) Blue Ice Dry Ice Water None
TA (circled) Client Box Other	IR-8 #36	1.0	0.8	Wet Ice (circled) Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
			☐ See Temperature Excursion Form	

WI-NC-099 Cooler Receipt Form Page 2 – Multiple Coolers

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone (412) 963-7058 Fax (412) 963-2468

1.4/C1.2

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Gamber, Carrie L	Carrier Tracking No(s):	COC No: 180-359673.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: carrie.gamber@testamericainc.com	State of Origin: Washington	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Washington		Job #: 180-87910-1
Address: 4101 Shuffel Street NW, ,	Due Date Requested: 4/17/2019			
City: North Canton	TAT Requested (days):			
State, Zip: OH, 44720				
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:			
Email:	WO #:			
Project Name: Time Oil CHE8384	Project #: 18020185			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015D_GRO/5030C Gasoline Range Organics [C6-C10]	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
TO-CS-AK-01 T05 0.5 (180-87910-25)	4/10/19	05:30 Pacific		Water			X	2	
TO-CS-BT-01 T05 0.5 (180-87910-26)	4/10/19	05:30 Pacific		Water			X	2	
MB-1 (180-87910-27)	4/10/19	05:30 Pacific		Water			X	2	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification: Unconfirmed	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	4/12/19 1700	TMA		4-11-19 925	TAE
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

TestAmerica Canton Sample Receipt Form/Narrative **Login # :** _____

Canton Facility

Client ETA Pittsburg Site Name _____ Cooler unpacked by:

Cooler Received on 4-11-19 Opened on 4-11-19

FedEx: 1st Grd (Exp) UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # 14 Foam Box Client Cooler Box Other _____

Packing material used: ~~Bubble Wrap~~ Foam ~~Plastic Bag~~ None Other _____

COOLANT: ~~Wet Ice~~ Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form

IR GUN# IR-8 (CF **-0.2** °C) Observed Cooler Temp. 1.4 °C Corrected Cooler Temp. 1.2 °C

IR GUN #36 (CF **+0.7**°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity_____	Yes (No)	
-Were the seals on the outside of the cooler(s) signed & dated?	Yes No (NA)	
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes (No)	
-Were tamper/custody seals intact and uncompromised?	(Yes) No NA	
3. Shippers' packing slip attached to the cooler(s)?	(Yes) No	
4. Did custody papers accompany the sample(s)?	(Yes) No	
5. Were the custody papers relinquished & signed in the appropriate place?	(Yes) No	
6. Was/were the person(s) who collected the samples clearly identified on the COC?	Yes (No)	
7. Did all bottles arrive in good condition (Unbroken)?	(Yes) No	
8. Could all bottle labels be reconciled with the COC?	(Yes) No	
9. Were correct bottle(s) used for the test(s) indicated?	(Yes) No	
10. Sufficient quantity received to perform indicated analyses?	(Yes) No	
11. Are these work share samples?	(Yes) No	
If yes, Questions 12-16 have been checked at the originating laboratory.		
12. Were all preserved sample(s) at the correct pH upon receipt?	Yes No NA	pH Strip Lot# **HC861525**
13. Were VOAs on the COC?	Yes No	
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this.	Yes No NA	
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____	Yes No	
16. Was a LL Hg or Me Hg trip blank present? _____	Yes No	

Tests that are not checked for pH by Receiving:

VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by:

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.

Sample(s) _____ were received in a broken container.

Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.

Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 180-87910-1

Login Number: 87910
List Number: 1
Creator: Watson, Debbie

List Source: Eurofins TestAmerica, Pittsburgh

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-89564-1
Client Project/Site: Time Oil CHE8384

For:
Geosyntec Consultants, Inc.
1420 Kensington Rd. , Ste. 103
Oak Brook, Illinois 60523

Attn: Jule Carr

Authorized for release by:
7/26/2019 10:37:22 AM

Carrie Gamber, Senior Project Manager
(412)963-2428
carrie.gamber@testamericainc.com

PA Lab ID: 02-00416

Table of Contents

Job ID: 180-89564-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

CASE NARRATIVE

Client: Geosyntec Consultants, Inc.

Project: Time Oil CHE8384

Report Number: 180-89564-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The samples were received on 04/30/2019; the samples arrived in good condition. The temperature of the coolers at receipt was 19.9 C.

VOLATILES
Internal standard (ISTD) response for TBA-d9 for the following samples were outside acceptance criteria: TO-ISS-AK-01 T04 (180-89564-4), TO-ISS-BT-01 T04 (180-89564-22), TO-ISS-BT-03 T04 (180-89564-31), BLANK T04 (180-89564-76), TO-ISS-AK-03 T06 (180-89564-15), (LCS 180-280453/15), (MB 180-280453/8), (180-89564-A-6-A MS) and (180-89564-A-6-A MSD). This ISTD does not correspond to any of the requested target compounds; therefore, the data have been reported.

o-Xylene and Xylenes, Total failed the recovery criteria low for the MSD of sample TO-ISS-BT-01 T09 (180-89564-27) in batch 180-284331.

Toluene failed the recovery criteria low for the MSD of sample TO-ISS-AK-01 T06 (180-89564-6) in batch 180-280453.

The continuing calibration verification (CCV) analyzed in batch 180-282660 was outside the method criteria for the following surrogate: 1,2-Dichloroethane-d4 (LOW). All sample recovered within QC for this surrogate.

8015D DRO
No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

8015 GRO
The surrogate in the continuing calibration verification (CCV) failed criteria low at 24.4%. The GRO ranges in the CCV passed criteria and all the samples passed surrogate criteria. After careful evaluation the data is reported. (CCV 240-382529/20).

GENERAL CHEMSITRY
No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC Semi VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc. Job ID: 180-89564-1
Project/Site: Time Oil CHE8384

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arkansas DEQ	State		19-033-0	06-27-20
Arkansas DEQ	State Program	6	88-0690	06-27-20
California	State		2891	04-30-20
California	State Program	9	2891	04-30-20
Connecticut	State		PH-0688	09-30-20
Connecticut	State Program	1	PH-0688	09-30-20
Florida	NELAP	4	E871008	06-30-20
Florida	NELAP		E871008	06-30-20
Illinois	NELAP	5	200005	06-30-20
Illinois	NELAP		004375	06-30-20
Kansas	NELAP	7	E-10350	01-31-20
Kansas	NELAP		E-10350	03-31-20
Kentucky (UST)	State Program	4	162013	04-30-20
Kentucky (WW)	State Program	4	KY98043	12-31-19
Louisiana	NELAP	6	04041	06-30-20
Minnesota	NELAP Secondary AB	5	042-999-482	12-31-19
Nevada	State		PA00164	07-31-19
Nevada	State Program	9	PA00164	07-31-19
New Hampshire	NELAP	1	2030	04-04-20
New Jersey	NELAP	2	PA005	06-30-20
New Jersey	NELAP		PA005	06-30-20
New York	NELAP	2	11182	03-31-20
New York	NELAP		11182	04-01-20
North Carolina (WW/SW)	State Program	4	434	12-31-19
Oregon	NELAP	10	PA-2151	02-06-20
Oregon	NELAP		PA-2151	02-06-20
Pennsylvania	NELAP	3	02-00416	04-30-20
Pennsylvania	NELAP		02-00416	04-30-20
Rhode Island	State		LAO00362	12-30-19
Rhode Island	State Program	1	LAO00362	12-30-19
South Carolina	State Program	4	89014	04-30-20
Texas	NELAP	6	T104704528-15-2	03-31-20
Texas	NELAP		T104704528	03-31-20
US Fish & Wildlife	Federal		LE94312A-1	07-31-19
US Fish & Wildlife	US Federal Programs		058448	07-31-20
USDA	Federal		P-Soil-01	06-26-22
Utah	NELAP	8	PA001462015-4	05-31-20
Utah	NELAP		PA001462019-8	05-31-20
Virginia	NELAP	3	460189	09-14-19
Virginia	NELAP		10043	09-14-19
West Virginia DEP	State		142	01-31-20
West Virginia DEP	State Program	3	142	01-31-20
Wisconsin	State		998027800	08-31-19
Wisconsin	State Program	5	998027800	08-31-19

Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc. Job ID: 180-89564-1
Project/Site: Time Oil CHE8384

Laboratory: Eurofins TestAmerica, Canton

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Washington	State Program	10	C971	01-12-20 *

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8015D		Water	Gasoline Range Organics [C6 - C10]
8015D	3510C	Water	C10-C34
8015D	3520C	Water	C10-C34

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-89564-1	TO-ISS-AK-01 T01	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-2	TO-ISS-AK-01 T02	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-3	TO-ISS-AK-01 T03	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-4	TO-ISS-AK-01 T04	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-5	TO-ISS-AK-01 T05	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-6	TO-ISS-AK-01 T06	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-7	TO-ISS-AK-01 T07	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-8	TO-ISS-AK-01 T08	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-9	TO-ISS-AK-01 T09	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-10	TO-ISS-AK-03 T01	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-11	TO-ISS-AK-03 T02	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-12	TO-ISS-AK-03 T03	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-13	TO-ISS-AK-03 T04	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-14	TO-ISS-AK-03 T05	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-15	TO-ISS-AK-03 T06	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-16	TO-ISS-AK-03 T07	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-17	TO-ISS-AK-03 T08	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-18	TO-ISS-AK-03 T09	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-19	TO-ISS-BT-01 T01	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-20	TO-ISS-BT-01 T02	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-21	TO-ISS-BT-01 T03	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-22	TO-ISS-BT-01 T04	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-23	TO-ISS-BT-01 T05	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-24	TO-ISS-BT-01 T06	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-25	TO-ISS-BT-01 T07	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-26	TO-ISS-BT-01 T08	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-27	TO-ISS-BT-01 T09	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-28	TO-ISS-BT-03 T01	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-29	TO-ISS-BT-03 T02	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-30	TO-ISS-BT-03 T03	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-31	TO-ISS-BT-03 T04	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-32	TO-ISS-BT-03 T05	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-33	TO-ISS-BT-03 T06	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-34	TO-ISS-BT-03 T07	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-35	TO-ISS-BT-03 T08	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-36	TO-ISS-BT-03 T09	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-37	TO-ISS-AK-01 T01	Water	05/06/19 05:00	04/30/19 15:40	
180-89564-38	TO-ISS-AK-01 T02	Water	05/07/19 05:00	04/30/19 15:40	
180-89564-39	TO-ISS-AK-01 T03	Water	05/08/19 05:00	04/30/19 15:40	
180-89564-40	TO-ISS-AK-01 T04	Water	05/13/19 05:00	04/30/19 15:40	
180-89564-41	TO-ISS-AK-01 T05	Water	05/20/19 05:00	04/30/19 15:40	
180-89564-42	TO-ISS-AK-01 T06	Water	06/03/19 05:00	04/30/19 15:40	
180-89564-43	TO-ISS-AK-01 T07	Water	06/17/19 05:00	04/30/19 15:40	
180-89564-44	TO-ISS-AK-01 T08	Water	06/24/19 05:00	04/30/19 15:40	
180-89564-45	TO-ISS-AK-01 T09	Water	07/08/19 05:00	04/30/19 15:40	
180-89564-46	TO-ISS-AK-03 T01	Water	05/06/19 05:05	04/30/19 15:40	
180-89564-47	TO-ISS-AK-03 T02	Water	05/07/19 05:05	04/30/19 15:40	
180-89564-48	TO-ISS-AK-03 T03	Water	05/08/19 05:05	04/30/19 15:40	
180-89564-49	TO-ISS-AK-03 T04	Water	05/13/19 05:05	04/30/19 15:40	
180-89564-50	TO-ISS-AK-03 T05	Water	05/20/19 05:05	04/30/19 15:40	
180-89564-51	TO-ISS-AK-03 T06	Water	06/03/19 05:05	04/30/19 15:40	
180-89564-52	TO-ISS-AK-03 T07	Water	06/17/19 05:05	04/30/19 15:40	
180-89564-53	TO-ISS-AK-03 T08	Water	06/24/19 05:05	04/30/19 15:40	

Sample Summary

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-89564-54	TO-ISS-AK-03 T09	Water	07/08/19 05:05	04/30/19 15:40	
180-89564-55	TO-ISS-BT-01 T01	Water	05/06/19 05:10	04/30/19 15:40	
180-89564-56	TO-ISS-BT-01 T02	Water	05/07/19 05:10	04/30/19 15:40	
180-89564-57	TO-ISS-BT-01 T03	Water	05/08/19 05:10	04/30/19 15:40	
180-89564-58	TO-ISS-BT-01 T04	Water	05/13/19 05:10	04/30/19 15:40	
180-89564-59	TO-ISS-BT-01 T05	Water	05/20/19 05:10	04/30/19 15:40	
180-89564-60	TO-ISS-BT-01 T06	Water	06/03/19 05:10	04/30/19 15:40	
180-89564-61	TO-ISS-BT-01 T07	Water	06/17/19 05:10	04/30/19 15:40	
180-89564-62	TO-ISS-BT-01 T08	Water	06/24/19 05:10	04/30/19 15:40	
180-89564-63	TO-ISS-BT-01 T09	Water	07/08/19 05:10	04/30/19 15:40	
180-89564-64	TO-ISS-BT-03 T01	Water	05/06/19 05:15	04/30/19 15:40	
180-89564-65	TO-ISS-BT-03 T02	Water	05/07/19 05:15	04/30/19 15:40	
180-89564-66	TO-ISS-BT-03 T03	Water	05/08/19 05:15	04/30/19 15:40	
180-89564-67	TO-ISS-BT-03 T04	Water	05/13/19 05:15	04/30/19 15:40	
180-89564-68	TO-ISS-BT-03 T05	Water	05/20/19 05:15	04/30/19 15:40	
180-89564-69	TO-ISS-BT-03 T06	Water	06/03/19 05:15	04/30/19 15:40	
180-89564-70	TO-ISS-BT-03 T07	Water	06/17/19 05:15	04/30/19 15:40	
180-89564-71	TO-ISS-BT-03 T08	Water	06/24/19 05:15	04/30/19 15:40	
180-89564-72	TO-ISS-BT-03 T09	Water	07/08/19 05:15	04/30/19 15:40	
180-89564-73	BLANK T01	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-74	BLANK T02	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-75	BLANK T03	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-76	BLANK T04	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-77	BLANK T05	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-78	BLANK T06	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-79	BLANK T07	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-80	BLANK T08	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-81	BLANK T09	Solid	04/26/19 00:00	04/30/19 15:40	
180-89564-82	BLANK T01	Water	05/06/19 05:15	04/30/19 15:40	
180-89564-83	BLANK T02	Water	05/07/19 05:15	04/30/19 15:40	
180-89564-84	BLANK T03	Water	05/08/19 05:15	04/30/19 15:40	
180-89564-85	BLANK T04	Water	05/13/19 05:15	04/30/19 15:40	
180-89564-86	BLANK T05	Water	05/20/19 05:15	04/30/19 15:40	
180-89564-87	BLANK T06	Water	06/03/19 05:15	04/30/19 15:40	
180-89564-88	BLANK T07	Water	06/17/19 05:15	04/30/19 15:40	
180-89564-89	BLANK T08	Water	06/24/19 05:15	04/30/19 15:40	
180-89564-90	BLANK T09	Water	07/08/19 05:15	04/30/19 15:40	

Method Summary

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Method	Method Description	Protocol	Laboratory
EPA 8260C	Volatile Organic Compounds (GC/MS)	SW846	TAL PIT
8015D	Gasoline Range Organics (GRO) (GC)	SW846	TAL CAN
8015D	Diesel Range Organics (DRO) (GC)	SW846	TAL CAN
2540G	SM 2540G	SM22	TAL PIT
EPA 9040C	pH	SW846	TAL PIT
SM 2510B	Conductivity, Specific Conductance	SM	TAL PIT
SM 2580B	Reduction-Oxidation (REDOX) Potential	SM	TAL PIT
1315	Semi-Dynamic Tank Leaching Procedure	SW846	TAL PIT
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	TAL CAN
3520C	Liquid-Liquid Extraction (Continuous)	SW846	TAL CAN
5030C	Purge and Trap	SW846	TAL CAN
5030C	Purge and Trap	SW846	TAL PIT

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater"

SM22 = Standard Methods For The Examination Of Water And Wastewater, 22nd Edition

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Client Sample ID: TO-ISS-AK-01 T01

Lab Sample ID: 180-89564-1
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			369.8 g	1798 mL	277812	05/06/19 08:00	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278065	05/08/19 15:38	PJJ	TAL PIT
	Instrument ID: CHHP10									
Total/NA	Analysis	2540G		1			278000	05/07/19 12:36	RJP	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			369.8 g	1798 mL	277812	05/06/19 08:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			277854	05/06/19 10:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			369.8 g	1798 mL	277812	05/06/19 08:00	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			277857	05/06/19 10:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			369.8 g	1798 mL	277812	05/06/19 08:00	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			277856	05/06/19 10:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-01 T02

Lab Sample ID: 180-89564-2
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			372.8 g	1798 mL	277830	05/06/19 10:00	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278065	05/08/19 17:18	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			372.8 g	1798 mL	277830	05/06/19 10:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			277961	05/07/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			372.8 g	1798 mL	277830	05/06/19 10:00	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			277964	05/07/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			372.8 g	1798 mL	277830	05/06/19 10:00	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			277963	05/07/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-01 T03

Lab Sample ID: 180-89564-3
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			372.6 g	1798 mL	277863	05/07/19 08:00	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278179	05/09/19 11:19	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			372.6 g	1798 mL	277863	05/07/19 08:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			278091	05/08/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-01 T03

Lab Sample ID: 180-89564-3

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			372.6 g	1798 mL	277863	05/07/19 08:00	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			278095	05/08/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			372.6 g	1798 mL	277863	05/07/19 08:00	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			278093	05/08/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-01 T04

Lab Sample ID: 180-89564-4

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			372.7 g	1798 mL	277865	05/08/19 08:00	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278479	05/13/19 12:13	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			372.7 g	1798 mL	277865	05/08/19 08:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			278504	05/13/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			372.7 g	1798 mL	277865	05/08/19 08:00	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			278507	05/13/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			372.7 g	1798 mL	277865	05/08/19 08:00	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			278506	05/13/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-01 T05

Lab Sample ID: 180-89564-5

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			372.4 g	1798 mL	277866	05/13/19 08:00	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	279149	05/20/19 14:16	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			372.4 g	1798 mL	277866	05/13/19 08:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			279182	05/20/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			372.4 g	1798 mL	277866	05/13/19 08:00	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			279184	05/20/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			372.4 g	1798 mL	277866	05/13/19 08:00	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			279183	05/20/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-01 T06

Lab Sample ID: 180-89564-6

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			372.6 g	1798 mL	277868	05/20/19 08:00	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	280453	06/03/19 12:23	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			372.6 g	1798 mL	277868	05/20/19 08:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			280486	06/03/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			372.6 g	1798 mL	277868	05/20/19 08:00	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			280488	06/03/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			372.6 g	1798 mL	277868	05/20/19 08:00	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			280487	06/03/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-01 T07

Lab Sample ID: 180-89564-7

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			373.1 g	1798 mL	277869	06/03/19 08:00	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	281902	06/17/19 17:08	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			373.1 g	1798 mL	277869	06/03/19 08:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			281963	06/17/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			373.1 g	1798 mL	277869	06/03/19 08:00	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			281966	06/17/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			373.1 g	1798 mL	277869	06/03/19 08:00	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			281964	06/17/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-01 T08

Lab Sample ID: 180-89564-8

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			373.7 g	1798 mL	277871	06/17/19 08:00	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	282660	06/24/19 16:44	PJJ	TAL PIT
	Instrument ID: CHHP5									
Leach	Leach	1315			373.7 g	1798 mL	277871	06/17/19 08:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			282773	06/24/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			373.7 g	1798 mL	277871	06/17/19 08:00	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			282776	06/24/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-01 T08

Lab Sample ID: 180-89564-8

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			373.7 g	1798 mL	277871	06/17/19 08:00	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			282774	06/24/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-01 T09

Lab Sample ID: 180-89564-9

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			374.0 g	1798 mL	277872	06/24/19 08:00	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	284331	07/10/19 13:42	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			374.0 g	1798 mL	277872	06/24/19 08:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			284773	07/08/19 08:20	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			374.0 g	1798 mL	277872	06/24/19 08:00	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			284784	07/08/19 08:20	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			374.0 g	1798 mL	277872	06/24/19 08:00	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			284783	07/08/19 08:20	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-03 T01

Lab Sample ID: 180-89564-10

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			381.0 g	1798 mL	277812	05/06/19 08:05	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278065	05/08/19 16:03	PJJ	TAL PIT
	Instrument ID: CHHP10									
Total/NA	Analysis	2540G		1			278000	05/07/19 12:36	RJP	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			381.0 g	1798 mL	277812	05/06/19 08:05	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			277854	05/06/19 10:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			381.0 g	1798 mL	277812	05/06/19 08:05	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			277857	05/06/19 10:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			381.0 g	1798 mL	277812	05/06/19 08:05	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			277856	05/06/19 10:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Client Sample ID: TO-ISS-AK-03 T02

Lab Sample ID: 180-89564-11

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			383.6 g	1798 mL	277830	05/06/19 10:05	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278065	05/08/19 17:43	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			383.6 g	1798 mL	277830	05/06/19 10:05	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			277961	05/07/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			383.6 g	1798 mL	277830	05/06/19 10:05	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			277964	05/07/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			383.6 g	1798 mL	277830	05/06/19 10:05	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			277963	05/07/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-03 T03

Lab Sample ID: 180-89564-12

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			384.9 g	1798 mL	277863	05/07/19 08:05	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278179	05/09/19 10:54	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			384.9 g	1798 mL	277863	05/07/19 08:05	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			278091	05/08/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			384.9 g	1798 mL	277863	05/07/19 08:05	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			278095	05/08/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			384.9 g	1798 mL	277863	05/07/19 08:05	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			278093	05/08/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-03 T04

Lab Sample ID: 180-89564-13

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			384.6 g	1798 mL	277865	05/08/19 08:05	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278479	05/13/19 13:53	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			384.6 g	1798 mL	277865	05/08/19 08:05	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			278504	05/13/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			384.6 g	1798 mL	277865	05/08/19 08:05	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			278507	05/13/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Client Sample ID: TO-ISS-AK-03 T04

Lab Sample ID: 180-89564-13

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			384.6 g	1798 mL	277865	05/08/19 08:05	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			278506	05/13/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-03 T05

Lab Sample ID: 180-89564-14

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			385.5 g	1798 mL	277866	05/13/19 08:05	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	279149	05/20/19 15:06	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			385.5 g	1798 mL	277866	05/13/19 08:05	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			279182	05/20/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			385.5 g	1798 mL	277866	05/13/19 08:05	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			279184	05/20/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			385.5 g	1798 mL	277866	05/13/19 08:05	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			279183	05/20/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-03 T06

Lab Sample ID: 180-89564-15

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			385.4 g	1798 mL	277868	05/20/19 08:05	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	280453	06/03/19 15:53	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			385.4 g	1798 mL	277868	05/20/19 08:05	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			280486	06/03/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			385.4 g	1798 mL	277868	05/20/19 08:05	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			280488	06/03/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			385.4 g	1798 mL	277868	05/20/19 08:05	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			280487	06/03/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-03 T07

Lab Sample ID: 180-89564-16

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			385.0 g	1798 mL	277869	06/03/19 08:05	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	281902	06/17/19 17:33	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			385.0 g	1798 mL	277869	06/03/19 08:05	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			281963	06/17/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			385.0 g	1798 mL	277869	06/03/19 08:05	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			281966	06/17/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			385.0 g	1798 mL	277869	06/03/19 08:05	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			281964	06/17/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-03 T08

Lab Sample ID: 180-89564-17

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			385.1 g	1798 mL	277871	06/17/19 08:05	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	282660	06/24/19 16:20	PJJ	TAL PIT
	Instrument ID: CHHP5									
Leach	Leach	1315			385.1 g	1798 mL	277871	06/17/19 08:05	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			282773	06/24/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			385.1 g	1798 mL	277871	06/17/19 08:05	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			282776	06/24/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			385.1 g	1798 mL	277871	06/17/19 08:05	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			282774	06/24/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-03 T09

Lab Sample ID: 180-89564-18

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			385.4 g	1798 mL	277872	06/24/19 08:05	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	284331	07/10/19 14:07	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			385.4 g	1798 mL	277872	06/24/19 08:05	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			284773	07/08/19 08:20	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			385.4 g	1798 mL	277872	06/24/19 08:05	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			284784	07/08/19 08:20	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-03 T09

Lab Sample ID: 180-89564-18

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			385.4 g	1798 mL	277872	06/24/19 08:05	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			284783	07/08/19 08:20	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-BT-01 T01

Lab Sample ID: 180-89564-19

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			377.8 g	1798 mL	277812	05/06/19 08:10	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278065	05/08/19 16:28	PJJ	TAL PIT
	Instrument ID: CHHP10									
Total/NA	Analysis	2540G		1			278000	05/07/19 12:36	RJP	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			377.8 g	1798 mL	277812	05/06/19 08:10	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			277854	05/06/19 10:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			377.8 g	1798 mL	277812	05/06/19 08:10	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			277857	05/06/19 10:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			377.8 g	1798 mL	277812	05/06/19 08:10	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			277856	05/06/19 10:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-BT-01 T02

Lab Sample ID: 180-89564-20

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			381.5 g	1798 mL	277830	05/06/19 10:10	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278065	05/08/19 18:08	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			381.5 g	1798 mL	277830	05/06/19 10:10	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			277961	05/07/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			381.5 g	1798 mL	277830	05/06/19 10:10	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			277964	05/07/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			381.5 g	1798 mL	277830	05/06/19 10:10	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			277963	05/07/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-BT-01 T03

Lab Sample ID: 180-89564-21

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			381.5 g	1798 mL	277863	05/07/19 08:10	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278179	05/09/19 10:29	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			381.5 g	1798 mL	277863	05/07/19 08:10	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			278091	05/08/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			381.5 g	1798 mL	277863	05/07/19 08:10	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			278095	05/08/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			381.5 g	1798 mL	277863	05/07/19 08:10	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			278093	05/08/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-BT-01 T04

Lab Sample ID: 180-89564-22

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			381.4 g	1798 mL	277865	05/08/19 08:10	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278479	05/13/19 13:03	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			381.4 g	1798 mL	277865	05/08/19 08:10	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			278504	05/13/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			381.4 g	1798 mL	277865	05/08/19 08:10	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			278507	05/13/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			381.4 g	1798 mL	277865	05/08/19 08:10	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			278506	05/13/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-BT-01 T05

Lab Sample ID: 180-89564-23

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			381.8 g	1798 mL	277866	05/13/19 08:10	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	279149	05/20/19 15:56	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			381.8 g	1798 mL	277866	05/13/19 08:10	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			279182	05/20/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			381.8 g	1798 mL	277866	05/13/19 08:10	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			279184	05/20/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Client Sample ID: TO-ISS-BT-01 T05

Lab Sample ID: 180-89564-23

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			381.8 g	1798 mL	277866	05/13/19 08:10	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			279183	05/20/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-BT-01 T06

Lab Sample ID: 180-89564-24

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			381.6 g	1798 mL	277868	05/20/19 08:10	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	280453	06/03/19 16:42	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			381.6 g	1798 mL	277868	05/20/19 08:10	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			280486	06/03/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			381.6 g	1798 mL	277868	05/20/19 08:10	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			280488	06/03/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			381.6 g	1798 mL	277868	05/20/19 08:10	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			280487	06/03/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-BT-01 T07

Lab Sample ID: 180-89564-25

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			382.1 g	1798 mL	277869	06/03/19 08:10	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	281902	06/17/19 17:58	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			382.1 g	1798 mL	277869	06/03/19 08:10	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			281963	06/17/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			382.1 g	1798 mL	277869	06/03/19 08:10	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			281966	06/17/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			382.1 g	1798 mL	277869	06/03/19 08:10	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			281964	06/17/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Client Sample ID: TO-ISS-BT-01 T08

Lab Sample ID: 180-89564-26

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			382.2 g	1798 mL	277871	06/17/19 08:10	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	282660	06/24/19 15:56	PJJ	TAL PIT
	Instrument ID: CHHP5									
Leach	Leach	1315			382.2 g	1798 mL	277871	06/17/19 08:10	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			282773	06/24/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			382.2 g	1798 mL	277871	06/17/19 08:10	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			282776	06/24/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			382.2 g	1798 mL	277871	06/17/19 08:10	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			282774	06/24/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-BT-01 T09

Lab Sample ID: 180-89564-27

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			382.0 g	1798 mL	277872	06/24/19 08:10	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	284331	07/10/19 14:33	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			382.0 g	1798 mL	277872	06/24/19 08:10	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			284773	07/08/19 08:20	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			382.0 g	1798 mL	277872	06/24/19 08:10	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			284784	07/08/19 08:20	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			382.0 g	1798 mL	277872	06/24/19 08:10	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			284783	07/08/19 08:20	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-BT-03 T01

Lab Sample ID: 180-89564-28

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			387.7 g	1798 mL	277812	05/06/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278065	05/08/19 16:53	PJJ	TAL PIT
	Instrument ID: CHHP10									
Total/NA	Analysis	2540G		1			278000	05/07/19 12:36	RJP	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			387.7 g	1798 mL	277812	05/06/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			277854	05/06/19 10:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Client Sample ID: TO-ISS-BT-03 T01

Lab Sample ID: 180-89564-28

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			387.7 g	1798 mL	277812	05/06/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			277857	05/06/19 10:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			387.7 g	1798 mL	277812	05/06/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			277856	05/06/19 10:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-BT-03 T02

Lab Sample ID: 180-89564-29

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			390.3 g	1798 mL	277830	05/06/19 10:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278065	05/08/19 18:33	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			390.3 g	1798 mL	277830	05/06/19 10:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			277961	05/07/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			390.3 g	1798 mL	277830	05/06/19 10:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			277964	05/07/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			390.3 g	1798 mL	277830	05/06/19 10:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			277963	05/07/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-BT-03 T03

Lab Sample ID: 180-89564-30

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			391.0 g	1798 mL	277863	05/07/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278179	05/09/19 10:04	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			391.0 g	1798 mL	277863	05/07/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			278091	05/08/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			391.0 g	1798 mL	277863	05/07/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			278095	05/08/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			391.0 g	1798 mL	277863	05/07/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			278093	05/08/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-BT-03 T04

Lab Sample ID: 180-89564-31

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			391.2 g	1798 mL	277865	05/08/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278479	05/13/19 13:28	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			391.2 g	1798 mL	277865	05/08/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			278504	05/13/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			391.2 g	1798 mL	277865	05/08/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			278507	05/13/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			391.2 g	1798 mL	277865	05/08/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			278506	05/13/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-BT-03 T05

Lab Sample ID: 180-89564-32

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			391.6 g	1798 mL	277866	05/13/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	279149	05/20/19 16:46	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			391.6 g	1798 mL	277866	05/13/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			279182	05/20/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			391.6 g	1798 mL	277866	05/13/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			279184	05/20/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			391.6 g	1798 mL	277866	05/13/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			279183	05/20/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-BT-03 T06

Lab Sample ID: 180-89564-33

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			391.5 g	1798 mL	277868	05/20/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	280453	06/03/19 17:32	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			391.5 g	1798 mL	277868	05/20/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			280486	06/03/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			391.5 g	1798 mL	277868	05/20/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			280488	06/03/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Client Sample ID: TO-ISS-BT-03 T06

Lab Sample ID: 180-89564-33
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			391.5 g	1798 mL	277868	05/20/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			280487	06/03/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-BT-03 T07

Lab Sample ID: 180-89564-34
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			391.9 g	1798 mL	277869	06/03/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	281902	06/17/19 18:23	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			391.9 g	1798 mL	277869	06/03/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			281963	06/17/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			391.9 g	1798 mL	277869	06/03/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			281966	06/17/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			391.9 g	1798 mL	277869	06/03/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			281964	06/17/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-BT-03 T08

Lab Sample ID: 180-89564-35
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			391.8 g	1798 mL	277871	06/17/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	282660	06/24/19 15:32	PJJ	TAL PIT
	Instrument ID: CHHP5									
Leach	Leach	1315			391.8 g	1798 mL	277871	06/17/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			282773	06/24/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			391.8 g	1798 mL	277871	06/17/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			282776	06/24/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			391.8 g	1798 mL	277871	06/17/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			282774	06/24/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-BT-03 T09

Lab Sample ID: 180-89564-36

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			391.5 g	1798 mL	277872	06/24/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	284331	07/10/19 14:58	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			391.5 g	1798 mL	277872	06/24/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			284773	07/08/19 08:20	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			391.5 g	1798 mL	277872	06/24/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			284784	07/08/19 08:20	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			391.5 g	1798 mL	277872	06/24/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			284783	07/08/19 08:20	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: TO-ISS-AK-01 T01

Lab Sample ID: 180-89564-37

Date Collected: 05/06/19 05:00

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	380447	05/10/19 23:02	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3520C			280 mL	5 mL	380404	05/09/19 10:18	BMB	TAL CAN
Total/NA	Analysis	8015D		1			380665	05/10/19 18:33	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-AK-01 T02

Lab Sample ID: 180-89564-38

Date Collected: 05/07/19 05:00

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	380660	05/11/19 00:32	LKG	TAL CAN
	Instrument ID: AFID									
Total/NA	Prep	3520C			280 mL	5 mL	380404	05/09/19 10:18	BMB	TAL CAN
Total/NA	Analysis	8015D		1			380665	05/10/19 19:00	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-AK-01 T03

Lab Sample ID: 180-89564-39

Date Collected: 05/08/19 05:00

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	380660	05/11/19 01:08	LKG	TAL CAN
	Instrument ID: AFID									
Total/NA	Prep	3520C			280 mL	5 mL	380685	05/10/19 11:51	BMB	TAL CAN
Total/NA	Analysis	8015D		1			380971	05/13/19 18:56	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-AK-01 T04

Lab Sample ID: 180-89564-40

Date Collected: 05/13/19 05:00

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	381358	05/15/19 13:38	KMG	TAL CAN
	Instrument ID: AFID									
Total/NA	Prep	3510C			280 mL	5 mL	381431	05/15/19 10:38	ACS	TAL CAN
Total/NA	Analysis	8015D		1			381700	05/16/19 20:07	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-AK-01 T05

Lab Sample ID: 180-89564-41

Date Collected: 05/20/19 05:00

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	382529	05/22/19 20:21	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3510C			280 mL	5 mL	382856	05/22/19 08:46	BMB	TAL CAN
Total/NA	Analysis	8015D		1			382883	05/24/19 02:53	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-AK-01 T06

Lab Sample ID: 180-89564-42

Date Collected: 06/03/19 05:00

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	384863	06/06/19 14:36	LKG	TAL CAN
	Instrument ID: AFID									
Total/NA	Prep	3510C			280 mL	5 mL	384644	06/05/19 11:29	ACS	TAL CAN
Total/NA	Analysis	8015D		1			385091	06/08/19 03:28	DEB	TAL CAN
	Instrument ID: A2HP14F									

Client Sample ID: TO-ISS-AK-01 T07

Lab Sample ID: 180-89564-43

Date Collected: 06/17/19 05:00

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	387560	06/21/19 17:48	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3510C			280 mL	5 mL	387359	06/20/19 13:55	CS	TAL CAN
Total/NA	Analysis	8015D		1			387934	06/24/19 21:12	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-AK-01 T08

Lab Sample ID: 180-89564-44

Date Collected: 06/24/19 05:00

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	388323	06/26/19 19:36	LKG	TAL CAN
	Instrument ID: YPID									

Client Sample ID: TO-ISS-AK-01 T08

Lab Sample ID: 180-89564-44

Date Collected: 06/24/19 05:00

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			270 mL	5 mL	388426	06/26/19 14:28	CS	TAL CAN
Total/NA	Analysis	8015D		1			388696	06/27/19 23:23	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-AK-01 T09

Lab Sample ID: 180-89564-45

Date Collected: 07/08/19 05:00

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	390440	07/10/19 11:30	KMG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3510C			270 mL	5 mL	391263	07/15/19 14:52	BMB	TAL CAN
Total/NA	Analysis	8015D		1			391441	07/17/19 07:23	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-AK-03 T01

Lab Sample ID: 180-89564-46

Date Collected: 05/06/19 05:05

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	380447	05/10/19 23:40	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3520C			280 mL	5 mL	380404	05/09/19 10:18	BMB	TAL CAN
Total/NA	Analysis	8015D		1			380665	05/10/19 19:27	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-AK-03 T02

Lab Sample ID: 180-89564-47

Date Collected: 05/07/19 05:05

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	380660	05/11/19 01:44	LKG	TAL CAN
	Instrument ID: AFID									
Total/NA	Prep	3520C			280 mL	5 mL	380404	05/09/19 10:18	BMB	TAL CAN
Total/NA	Analysis	8015D		1			380665	05/10/19 19:55	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-AK-03 T03

Lab Sample ID: 180-89564-48

Date Collected: 05/08/19 05:05

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	380660	05/11/19 03:31	LKG	TAL CAN
	Instrument ID: AFID									

Client Sample ID: TO-ISS-AK-03 T03

Lab Sample ID: 180-89564-48
Date Collected: 05/08/19 05:05
Matrix: Water
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			280 mL	5 mL	380685	05/10/19 11:51	BMB	TAL CAN
Total/NA	Analysis	8015D		1			380971	05/13/19 19:24	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-AK-03 T04

Lab Sample ID: 180-89564-49
Date Collected: 05/13/19 05:05
Matrix: Water
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	381358	05/15/19 15:32	KMG	TAL CAN
	Instrument ID: AFID									
Total/NA	Prep	3510C			280 mL	5 mL	381431	05/15/19 10:38	ACS	TAL CAN
Total/NA	Analysis	8015D		1			381700	05/16/19 20:34	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-AK-03 T05

Lab Sample ID: 180-89564-50
Date Collected: 05/20/19 05:05
Matrix: Water
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	382529	05/22/19 21:03	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3510C			280 mL	5 mL	382856	05/22/19 08:46	BMB	TAL CAN
Total/NA	Analysis	8015D		1			382883	05/24/19 03:20	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-AK-03 T06

Lab Sample ID: 180-89564-51
Date Collected: 06/03/19 05:05
Matrix: Water
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	384863	06/06/19 15:15	LKG	TAL CAN
	Instrument ID: AFID									
Total/NA	Prep	3510C			280 mL	5 mL	384644	06/05/19 11:29	ACS	TAL CAN
Total/NA	Analysis	8015D		1			385091	06/08/19 03:55	DEB	TAL CAN
	Instrument ID: A2HP14F									

Client Sample ID: TO-ISS-AK-03 T07

Lab Sample ID: 180-89564-52
Date Collected: 06/17/19 05:05
Matrix: Water
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	387560	06/21/19 19:47	LKG	TAL CAN
	Instrument ID: YPID									

Client Sample ID: TO-ISS-AK-03 T07

Lab Sample ID: 180-89564-52

Date Collected: 06/17/19 05:05

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			280 mL	5 mL	387359	06/20/19 13:55	CS	TAL CAN
Total/NA	Analysis	8015D		1			387934	06/24/19 21:39	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-AK-03 T08

Lab Sample ID: 180-89564-53

Date Collected: 06/24/19 05:05

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	388323	06/26/19 20:19	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3510C			280 mL	5 mL	388426	06/26/19 14:28	CS	TAL CAN
Total/NA	Analysis	8015D		1			388696	06/27/19 23:50	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-AK-03 T09

Lab Sample ID: 180-89564-54

Date Collected: 07/08/19 05:05

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	390440	07/10/19 13:43	KMG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3510C			270 mL	5 mL	391263	07/15/19 14:52	BMB	TAL CAN
Total/NA	Analysis	8015D		1			391441	07/17/19 07:50	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-BT-01 T01

Lab Sample ID: 180-89564-55

Date Collected: 05/06/19 05:10

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	380447	05/11/19 00:19	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3520C			280 mL	5 mL	380404	05/09/19 10:18	BMB	TAL CAN
Total/NA	Analysis	8015D		1			380665	05/10/19 20:22	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-BT-01 T02

Lab Sample ID: 180-89564-56

Date Collected: 05/07/19 05:10

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	380660	05/11/19 04:08	LKG	TAL CAN
	Instrument ID: AFID									

Client Sample ID: TO-ISS-BT-01 T02

Lab Sample ID: 180-89564-56
Matrix: Water
Date Collected: 05/07/19 05:10
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			280 mL	5 mL	380404	05/09/19 10:18	BMB	TAL CAN
Total/NA	Analysis	8015D		1			380665	05/10/19 20:49	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-BT-01 T03

Lab Sample ID: 180-89564-57
Matrix: Water
Date Collected: 05/08/19 05:10
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	380660	05/11/19 04:44	LKG	TAL CAN
	Instrument ID: AFID									
Total/NA	Prep	3520C			280 mL	5 mL	380685	05/10/19 11:51	BMB	TAL CAN
Total/NA	Analysis	8015D		1			380971	05/13/19 19:51	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-BT-01 T04

Lab Sample ID: 180-89564-58
Matrix: Water
Date Collected: 05/13/19 05:10
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	381358	05/15/19 16:11	KMG	TAL CAN
	Instrument ID: AFID									
Total/NA	Prep	3510C			280 mL	5 mL	381431	05/15/19 10:38	ACS	TAL CAN
Total/NA	Analysis	8015D		1			381700	05/16/19 21:01	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-BT-01 T05

Lab Sample ID: 180-89564-59
Matrix: Water
Date Collected: 05/20/19 05:10
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	382529	05/22/19 21:44	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3510C			280 mL	5 mL	382856	05/22/19 08:46	BMB	TAL CAN
Total/NA	Analysis	8015D		1			382883	05/24/19 03:47	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-BT-01 T06

Lab Sample ID: 180-89564-60
Matrix: Water
Date Collected: 06/03/19 05:10
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	384863	06/06/19 15:53	LKG	TAL CAN
	Instrument ID: AFID									

Client Sample ID: TO-ISS-BT-01 T06

Lab Sample ID: 180-89564-60

Date Collected: 06/03/19 05:10

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			280 mL	5 mL	384644	06/05/19 11:29	ACS	TAL CAN
Total/NA	Analysis	8015D		1			385091	06/08/19 04:22	DEB	TAL CAN
	Instrument ID: A2HP14F									

Client Sample ID: TO-ISS-BT-01 T07

Lab Sample ID: 180-89564-61

Date Collected: 06/17/19 05:10

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	387560	06/21/19 20:26	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3510C			280 mL	5 mL	387359	06/20/19 13:55	CS	TAL CAN
Total/NA	Analysis	8015D		1			387934	06/24/19 22:07	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-BT-01 T08

Lab Sample ID: 180-89564-62

Date Collected: 06/24/19 05:10

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	388323	06/26/19 21:04	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3510C			280 mL	5 mL	388426	06/26/19 14:28	CS	TAL CAN
Total/NA	Analysis	8015D		1			388696	06/28/19 00:18	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-BT-01 T09

Lab Sample ID: 180-89564-63

Date Collected: 07/08/19 05:10

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	390440	07/10/19 14:31	KMG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3510C			270 mL	5 mL	391263	07/15/19 14:52	BMB	TAL CAN
Total/NA	Analysis	8015D		1			391441	07/17/19 08:18	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-BT-03 T01

Lab Sample ID: 180-89564-64

Date Collected: 05/06/19 05:15

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	380447	05/11/19 00:57	LKG	TAL CAN
	Instrument ID: YPID									

Client Sample ID: TO-ISS-BT-03 T01

Lab Sample ID: 180-89564-64
Matrix: Water
Date Collected: 05/06/19 05:15
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			280 mL	5 mL	380404	05/09/19 10:18	BMB	TAL CAN
Total/NA	Analysis	8015D		1			380665	05/10/19 21:16	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-BT-03 T02

Lab Sample ID: 180-89564-65
Matrix: Water
Date Collected: 05/07/19 05:15
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	380660	05/11/19 05:20	LKG	TAL CAN
	Instrument ID: AFID									
Total/NA	Prep	3520C			280 mL	5 mL	380404	05/09/19 10:18	BMB	TAL CAN
Total/NA	Analysis	8015D		1			380665	05/10/19 21:43	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-BT-03 T03

Lab Sample ID: 180-89564-66
Matrix: Water
Date Collected: 05/08/19 05:15
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	380660	05/11/19 05:56	LKG	TAL CAN
	Instrument ID: AFID									
Total/NA	Prep	3520C			280 mL	5 mL	380685	05/10/19 11:51	BMB	TAL CAN
Total/NA	Analysis	8015D		1			380971	05/13/19 20:18	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-BT-03 T04

Lab Sample ID: 180-89564-67
Matrix: Water
Date Collected: 05/13/19 05:15
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	381358	05/15/19 16:48	KMG	TAL CAN
	Instrument ID: AFID									
Total/NA	Prep	3510C			280 mL	5 mL	381431	05/15/19 10:38	ACS	TAL CAN
Total/NA	Analysis	8015D		1			381700	05/16/19 21:56	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-BT-03 T05

Lab Sample ID: 180-89564-68
Matrix: Water
Date Collected: 05/20/19 05:15
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	382529	05/22/19 23:48	LKG	TAL CAN
	Instrument ID: YPID									

Client Sample ID: TO-ISS-BT-03 T05

Lab Sample ID: 180-89564-68

Date Collected: 05/20/19 05:15

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			280 mL	5 mL	382856	05/22/19 08:46	BMB	TAL CAN
Total/NA	Analysis	8015D		1			382883	05/24/19 04:14	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-BT-03 T06

Lab Sample ID: 180-89564-69

Date Collected: 06/03/19 05:15

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	384863	06/06/19 16:31	LKG	TAL CAN
	Instrument ID: AFID									
Total/NA	Prep	3510C			280 mL	5 mL	384644	06/05/19 11:29	ACS	TAL CAN
Total/NA	Analysis	8015D		1			385091	06/08/19 04:49	DEB	TAL CAN
	Instrument ID: A2HP14F									

Client Sample ID: TO-ISS-BT-03 T07

Lab Sample ID: 180-89564-70

Date Collected: 06/17/19 05:15

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	387560	06/21/19 21:05	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3510C			280 mL	5 mL	387359	06/20/19 13:55	CS	TAL CAN
Total/NA	Analysis	8015D		1			387934	06/24/19 22:34	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-BT-03 T08

Lab Sample ID: 180-89564-71

Date Collected: 06/24/19 05:15

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	388323	06/26/19 21:46	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3510C			280 mL	5 mL	388426	06/26/19 14:28	CS	TAL CAN
Total/NA	Analysis	8015D		1			388696	06/28/19 00:45	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: TO-ISS-BT-03 T09

Lab Sample ID: 180-89564-72

Date Collected: 07/08/19 05:15

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	390440	07/10/19 15:20	KMG	TAL CAN
	Instrument ID: YPID									

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Client Sample ID: TO-ISS-BT-03 T09

Lab Sample ID: 180-89564-72
Matrix: Water
Date Collected: 07/08/19 05:15
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			270 mL	5 mL	391263	07/15/19 14:52	BMB	TAL CAN
Total/NA	Analysis	8015D		1			391441	07/17/19 08:45	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: BLANK T01

Lab Sample ID: 180-89564-73
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			1.0 g	2000 mL	277812	05/06/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278065	05/08/19 13:30	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			1.0 g	2000 mL	277812	05/06/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			277854	05/06/19 10:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			1.0 g	2000 mL	277812	05/06/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			277857	05/06/19 10:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			1.0 g	2000 mL	277812	05/06/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			277856	05/06/19 10:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: BLANK T02

Lab Sample ID: 180-89564-74
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			1.0 g	2000 mL	277830	05/06/19 10:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278065	05/08/19 14:48	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			1.0 g	2000 mL	277830	05/06/19 10:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			277961	05/07/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			1.0 g	2000 mL	277830	05/06/19 10:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			277964	05/07/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			1.0 g	2000 mL	277830	05/06/19 10:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			277963	05/07/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: BLANK T03

Lab Sample ID: 180-89564-75

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			1.0 g	2000 mL	277863	05/07/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278179	05/09/19 09:39	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			1.0 g	2000 mL	277863	05/07/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			278091	05/08/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			1.0 g	2000 mL	277863	05/07/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			278095	05/08/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			1.0 g	2000 mL	277863	05/07/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			278093	05/08/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: BLANK T04

Lab Sample ID: 180-89564-76

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			1.0 g	2000 mL	277865	05/08/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	278479	05/13/19 11:49	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			1.0 g	2000 mL	277865	05/08/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			278504	05/13/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			1.0 g	2000 mL	277865	05/08/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			278507	05/13/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			1.0 g	2000 mL	277865	05/08/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			278506	05/13/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: BLANK T05

Lab Sample ID: 180-89564-77

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			1.0 g	2000 mL	277866	05/13/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	279149	05/20/19 13:26	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			1.0 g	2000 mL	277866	05/13/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			279182	05/20/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			1.0 g	2000 mL	277866	05/13/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			279184	05/20/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: BLANK T05

Lab Sample ID: 180-89564-77

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			1.0 g	2000 mL	277866	05/13/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			279183	05/20/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: BLANK T06

Lab Sample ID: 180-89564-78

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			1.0 g	2000 mL	277868	05/20/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	280453	06/03/19 13:02	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			1.0 g	2000 mL	277868	05/20/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			280486	06/03/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			1.0 g	2000 mL	277868	05/20/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			280488	06/03/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			1.0 g	2000 mL	277868	05/20/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			280487	06/03/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: BLANK T07

Lab Sample ID: 180-89564-79

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			1.0 g	2000 mL	277869	06/03/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	281902	06/17/19 16:43	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			1.0 g	2000 mL	277869	06/03/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			281963	06/17/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			1.0 g	2000 mL	277869	06/03/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			281966	06/17/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			1.0 g	2000 mL	277869	06/03/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			281964	06/17/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: BLANK T08

Lab Sample ID: 180-89564-80

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			1.0 g	2000 mL	277871	06/17/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	282660	06/24/19 15:08	PJJ	TAL PIT
	Instrument ID: CHHP5									
Leach	Leach	1315			1.0 g	2000 mL	277871	06/17/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			282773	06/24/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			1.0 g	2000 mL	277871	06/17/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			282776	06/24/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			1.0 g	2000 mL	277871	06/17/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			282774	06/24/19 08:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: BLANK T09

Lab Sample ID: 180-89564-81

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1315			1.0 g	2000 mL	277872	06/24/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 8260C		1	5 mL	5 mL	284331	07/10/19 15:23	PJJ	TAL PIT
	Instrument ID: CHHP10									
Leach	Leach	1315			1.0 g	2000 mL	277872	06/24/19 08:15	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			284773	07/08/19 08:20	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			1.0 g	2000 mL	277872	06/24/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			284784	07/08/19 08:20	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1315			1.0 g	2000 mL	277872	06/24/19 08:15	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			284783	07/08/19 08:20	MTW	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: BLANK T01

Lab Sample ID: 180-89564-82

Date Collected: 05/06/19 05:15

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	380447	05/11/19 01:36	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3520C			280 mL	5 mL	380404	05/09/19 10:18	BMB	TAL CAN
Total/NA	Analysis	8015D		1			380665	05/10/19 22:37	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: BLANK T02

Lab Sample ID: 180-89564-83

Date Collected: 05/07/19 05:15

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	380660	05/11/19 06:32	LKG	TAL CAN
	Instrument ID: AFID									
Total/NA	Prep	3520C			280 mL	5 mL	380404	05/09/19 10:18	BMB	TAL CAN
Total/NA	Analysis	8015D		1			380665	05/10/19 23:04	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: BLANK T03

Lab Sample ID: 180-89564-84

Date Collected: 05/08/19 05:15

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	380660	05/11/19 07:09	LKG	TAL CAN
	Instrument ID: AFID									
Total/NA	Prep	3520C			280 mL	5 mL	380685	05/10/19 11:51	BMB	TAL CAN
Total/NA	Analysis	8015D		1			380971	05/13/19 20:45	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: BLANK T04

Lab Sample ID: 180-89564-85

Date Collected: 05/13/19 05:15

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	381358	05/15/19 17:26	KMG	TAL CAN
	Instrument ID: AFID									
Total/NA	Prep	3510C			280 mL	5 mL	381431	05/15/19 10:38	ACS	TAL CAN
Total/NA	Analysis	8015D		1			381700	05/16/19 22:24	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: BLANK T05

Lab Sample ID: 180-89564-86

Date Collected: 05/20/19 05:15

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	382529	05/23/19 00:29	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3510C			280 mL	5 mL	382856	05/22/19 08:46	BMB	TAL CAN
Total/NA	Analysis	8015D		1			382883	05/24/19 04:42	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: BLANK T06

Lab Sample ID: 180-89564-87

Date Collected: 06/03/19 05:15

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	384863	06/06/19 17:10	LKG	TAL CAN
	Instrument ID: AFID									

Client Sample ID: BLANK T06

Lab Sample ID: 180-89564-87

Date Collected: 06/03/19 05:15

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			280 mL	5 mL	384644	06/05/19 11:29	ACS	TAL CAN
Total/NA	Analysis	8015D		1			385091	06/08/19 05:16	DEB	TAL CAN
	Instrument ID: A2HP14F									

Client Sample ID: BLANK T07

Lab Sample ID: 180-89564-88

Date Collected: 06/17/19 05:15

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	387560	06/21/19 21:44	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3510C			280 mL	5 mL	387359	06/20/19 13:55	CS	TAL CAN
Total/NA	Analysis	8015D		1			387934	06/24/19 23:01	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: BLANK T08

Lab Sample ID: 180-89564-89

Date Collected: 06/24/19 05:15

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	388323	06/26/19 22:29	LKG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3510C			280 mL	5 mL	388426	06/26/19 14:28	CS	TAL CAN
Total/NA	Analysis	8015D		1			388696	06/28/19 01:12	DEB	TAL CAN
	Instrument ID: A2HP14R									

Client Sample ID: BLANK T09

Lab Sample ID: 180-89564-90

Date Collected: 07/08/19 05:15

Matrix: Water

Date Received: 04/30/19 15:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015D		1	5 mL	5 mL	390440	07/10/19 16:11	KMG	TAL CAN
	Instrument ID: YPID									
Total/NA	Prep	3510C			280 mL	5 mL	391263	07/15/19 14:52	BMB	TAL CAN
Total/NA	Analysis	8015D		1			391441	07/17/19 09:13	DEB	TAL CAN
	Instrument ID: A2HP14R									

Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Analyst References:

Lab: TAL CAN

Batch Type: Prep

ACS = Alyssa Strelecki
BMB = Brittany Blythe
CS = Caitlin Scott

Batch Type: Analysis

DEB = Deborah Bolgrin
KMG = Katie Grant
LKG = Lucas Grossman

Lab: TAL PIT

Batch Type: Leach

MTW = Michael Wesoloski

Batch Type: Analysis

MTW = Michael Wesoloski
PJJ = Patrick Journet
RJP = Rockwell Pokrant

Client Sample ID: TO-ISS-AK-01 T01

Lab Sample ID: 180-89564-1

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/08/19 15:38	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/08/19 15:38	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/08/19 15:38	1
o-Xylene	ND		1.0	0.41	ug/L			05/08/19 15:38	1
Toluene	ND		1.0	0.46	ug/L			05/08/19 15:38	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/08/19 15:38	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/08/19 15:38	1
Trichloroethene	ND		1.0	0.69	ug/L			05/08/19 15:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*70 - 150*		*05/08/19 15:38*	*1*
4-Bromofluorobenzene (Surr)	*95*		*64 - 123*		*05/08/19 15:38*	*1*
Dibromofluoromethane (Surr)	*113*		*75 - 147*		*05/08/19 15:38*	*1*
Toluene-d8 (Surr)	*106*		*78 - 128*		*05/08/19 15:38*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**24.0**		0.1	0.1	%			05/07/19 12:36	1
Percent Solids	**76.0**		0.1	0.1	%			05/07/19 12:36	1

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**10.3**		0.1	0.1	SU			05/06/19 10:15	1
Specific Conductance	**170**		1.0	1.0	umhos/cm			05/06/19 10:15	1
Oxidation Reduction Potential	**530**		10	10	millivolts			05/06/19 10:15	1

Client Sample ID: TO-ISS-AK-01 T02

Lab Sample ID: 180-89564-2

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/08/19 17:18	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/08/19 17:18	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/08/19 17:18	1
o-Xylene	ND		1.0	0.41	ug/L			05/08/19 17:18	1
Toluene	ND		1.0	0.46	ug/L			05/08/19 17:18	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/08/19 17:18	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/08/19 17:18	1
Trichloroethene	**0.70**	**J**	1.0	0.69	ug/L			05/08/19 17:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*83*		*70 - 150*		*05/08/19 17:18*	*1*
4-Bromofluorobenzene (Surr)	*88*		*64 - 123*		*05/08/19 17:18*	*1*
Dibromofluoromethane (Surr)	*101*		*75 - 147*		*05/08/19 17:18*	*1*
Toluene-d8 (Surr)	*103*		*78 - 128*		*05/08/19 17:18*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.6**		0.1	0.1	SU			05/07/19 08:15	1
Specific Conductance	**760**		1.0	1.0	umhos/cm			05/07/19 08:15	1

Client Sample ID: TO-ISS-AK-01 T02

Lab Sample ID: 180-89564-2
Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

General Chemistry - Leach (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Oxidation Reduction Potential	**180**		10	10	millivolts			05/07/19 08:15	1

Client Sample ID: TO-ISS-AK-01 T03

Lab Sample ID: 180-89564-3
Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/09/19 11:19	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/09/19 11:19	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/09/19 11:19	1
o-Xylene	ND		1.0	0.41	ug/L			05/09/19 11:19	1
Toluene	ND		1.0	0.46	ug/L			05/09/19 11:19	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/09/19 11:19	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/09/19 11:19	1
Trichloroethene	**1.4**		1.0	0.69	ug/L			05/09/19 11:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*70 - 150*		*05/09/19 11:19*	*1*
4-Bromofluorobenzene (Surr)	*87*		*64 - 123*		*05/09/19 11:19*	*1*
Dibromofluoromethane (Surr)	*107*		*75 - 147*		*05/09/19 11:19*	*1*
Toluene-d8 (Surr)	*98*		*78 - 128*		*05/09/19 11:19*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.4**		0.1	0.1	SU			05/08/19 08:15	1
Specific Conductance	**550**		1.0	1.0	umhos/cm			05/08/19 08:15	1
Oxidation Reduction Potential	**220**		10	10	millivolts			05/08/19 08:15	1

Client Sample ID: TO-ISS-AK-01 T04

Lab Sample ID: 180-89564-4
Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/13/19 12:13	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/13/19 12:13	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/13/19 12:13	1
o-Xylene	ND		1.0	0.41	ug/L			05/13/19 12:13	1
Toluene	ND		1.0	0.46	ug/L			05/13/19 12:13	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/13/19 12:13	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/13/19 12:13	1
Trichloroethene	**6.3**		1.0	0.69	ug/L			05/13/19 12:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*86*		*70 - 150*		*05/13/19 12:13*	*1*
4-Bromofluorobenzene (Surr)	*83*		*64 - 123*		*05/13/19 12:13*	*1*
Dibromofluoromethane (Surr)	*106*		*75 - 147*		*05/13/19 12:13*	*1*
Toluene-d8 (Surr)	*99*		*78 - 128*		*05/13/19 12:13*	*1*

Client Sample ID: TO-ISS-AK-01 T04

Lab Sample ID: 180-89564-4

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.7**		0.1	0.1	SU			05/13/19 08:15	1
Specific Conductance	**1200**		1.0	1.0	umhos/cm			05/13/19 08:15	1
Oxidation Reduction Potential	**180**		10	10	millivolts			05/13/19 08:15	1

Client Sample ID: TO-ISS-AK-01 T05

Lab Sample ID: 180-89564-5

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/20/19 14:16	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/20/19 14:16	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/20/19 14:16	1
o-Xylene	ND		1.0	0.41	ug/L			05/20/19 14:16	1
Toluene	ND		1.0	0.46	ug/L			05/20/19 14:16	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/20/19 14:16	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/20/19 14:16	1
Trichloroethene	**9.5**		1.0	0.69	ug/L			05/20/19 14:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*70 - 150*		*05/20/19 14:16*	*1*
4-Bromofluorobenzene (Surr)	*89*		*64 - 123*		*05/20/19 14:16*	*1*
Dibromofluoromethane (Surr)	*107*		*75 - 147*		*05/20/19 14:16*	*1*
Toluene-d8 (Surr)	*89*		*78 - 128*		*05/20/19 14:16*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.7**		0.1	0.1	SU			05/20/19 08:15	1
Specific Conductance	**1100**		1.0	1.0	umhos/cm			05/20/19 08:15	1
Oxidation Reduction Potential	**140**		10	10	millivolts			05/20/19 08:15	1

Client Sample ID: TO-ISS-AK-01 T06

Lab Sample ID: 180-89564-6

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/03/19 12:23	1
Ethylbenzene	ND		1.0	0.51	ug/L			06/03/19 12:23	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			06/03/19 12:23	1
o-Xylene	ND		1.0	0.41	ug/L			06/03/19 12:23	1
Toluene	ND	F1	1.0	0.46	ug/L			06/03/19 12:23	1
Xylenes, Total	ND		2.0	0.89	ug/L			06/03/19 12:23	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/03/19 12:23	1
Trichloroethene	**28**		1.0	0.69	ug/L			06/03/19 12:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*70 - 150*		*06/03/19 12:23*	*1*
4-Bromofluorobenzene (Surr)	*90*		*64 - 123*		*06/03/19 12:23*	*1*
Dibromofluoromethane (Surr)	*106*		*75 - 147*		*06/03/19 12:23*	*1*
Toluene-d8 (Surr)	*82*		*78 - 128*		*06/03/19 12:23*	*1*

Client Sample ID: TO-ISS-AK-01 T06

Lab Sample ID: 180-89564-6
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.8**		0.1	0.1	SU			06/03/19 08:15	1
Specific Conductance	**1200**		1.0	1.0	umhos/cm			06/03/19 08:15	1
Oxidation Reduction Potential	**160**		10	10	millivolts			06/03/19 08:15	1

Client Sample ID: TO-ISS-AK-01 T07

Lab Sample ID: 180-89564-7
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/17/19 17:08	1
Ethylbenzene	ND		1.0	0.51	ug/L			06/17/19 17:08	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			06/17/19 17:08	1
o-Xylene	ND		1.0	0.41	ug/L			06/17/19 17:08	1
Toluene	ND		1.0	0.46	ug/L			06/17/19 17:08	1
Xylenes, Total	ND		2.0	0.89	ug/L			06/17/19 17:08	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/17/19 17:08	1
Trichloroethene	**33**		1.0	0.69	ug/L			06/17/19 17:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*105*		*70 - 150*		*06/17/19 17:08*	*1*
4-Bromofluorobenzene (Surr)	*103*		*64 - 123*		*06/17/19 17:08*	*1*
Dibromofluoromethane (Surr)	*117*		*75 - 147*		*06/17/19 17:08*	*1*
Toluene-d8 (Surr)	*106*		*78 - 128*		*06/17/19 17:08*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.6**		0.1	0.1	SU			06/17/19 08:15	1
Specific Conductance	**1100**		1.0	1.0	umhos/cm			06/17/19 08:15	1
Oxidation Reduction Potential	**170**		10	10	millivolts			06/17/19 08:15	1

Client Sample ID: TO-ISS-AK-01 T08

Lab Sample ID: 180-89564-8
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/24/19 16:44	1
Ethylbenzene	ND		1.0	0.51	ug/L			06/24/19 16:44	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			06/24/19 16:44	1
o-Xylene	ND		1.0	0.41	ug/L			06/24/19 16:44	1
Toluene	ND		1.0	0.46	ug/L			06/24/19 16:44	1
Xylenes, Total	ND		2.0	0.89	ug/L			06/24/19 16:44	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/24/19 16:44	1
Trichloroethene	**12**		1.0	0.69	ug/L			06/24/19 16:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*70 - 150*		*06/24/19 16:44*	*1*
4-Bromofluorobenzene (Surr)	*76*		*64 - 123*		*06/24/19 16:44*	*1*
Dibromofluoromethane (Surr)	*101*		*75 - 147*		*06/24/19 16:44*	*1*
Toluene-d8 (Surr)	*95*		*78 - 128*		*06/24/19 16:44*	*1*

Client Sample ID: TO-ISS-AK-01 T08

Lab Sample ID: 180-89564-8
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.5**		0.1	0.1	SU			06/24/19 08:15	1
Specific Conductance	**740**		1.0	1.0	umhos/cm			06/24/19 08:15	1
Oxidation Reduction Potential	**190**		10	10	millivolts			06/24/19 08:15	1

Client Sample ID: TO-ISS-AK-01 T09

Lab Sample ID: 180-89564-9
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			07/10/19 13:42	1
Ethylbenzene	ND		1.0	0.51	ug/L			07/10/19 13:42	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			07/10/19 13:42	1
o-Xylene	ND		1.0	0.41	ug/L			07/10/19 13:42	1
Toluene	ND		1.0	0.46	ug/L			07/10/19 13:42	1
Xylenes, Total	ND		2.0	0.89	ug/L			07/10/19 13:42	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			07/10/19 13:42	1
Trichloroethene	**19**		1.0	0.69	ug/L			07/10/19 13:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*81*		*70 - 150*		*07/10/19 13:42*	*1*
4-Bromofluorobenzene (Surr)	*98*		*64 - 123*		*07/10/19 13:42*	*1*
Dibromofluoromethane (Surr)	*96*		*75 - 147*		*07/10/19 13:42*	*1*
Toluene-d8 (Surr)	*108*		*78 - 128*		*07/10/19 13:42*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.4**		0.1	0.1	SU			07/08/19 08:20	1
Specific Conductance	**620**		1.0	1.0	umhos/cm			07/08/19 08:20	1
Oxidation Reduction Potential	**250**		10	10	millivolts			07/08/19 08:20	1

Client Sample ID: TO-ISS-AK-03 T01

Lab Sample ID: 180-89564-10
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/08/19 16:03	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/08/19 16:03	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/08/19 16:03	1
o-Xylene	ND		1.0	0.41	ug/L			05/08/19 16:03	1
Toluene	ND		1.0	0.46	ug/L			05/08/19 16:03	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/08/19 16:03	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/08/19 16:03	1
Trichloroethene	ND		1.0	0.69	ug/L			05/08/19 16:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*86*		*70 - 150*		*05/08/19 16:03*	*1*
4-Bromofluorobenzene (Surr)	*93*		*64 - 123*		*05/08/19 16:03*	*1*
Dibromofluoromethane (Surr)	*102*		*75 - 147*		*05/08/19 16:03*	*1*
Toluene-d8 (Surr)	*108*		*78 - 128*		*05/08/19 16:03*	*1*

Client Sample ID: TO-ISS-AK-03 T01

Lab Sample ID: 180-89564-10
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**21.5**		0.1	0.1	%			05/07/19 12:36	1
Percent Solids	**78.5**		0.1	0.1	%			05/07/19 12:36	1

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**10.1**		0.1	0.1	SU			05/06/19 10:15	1
Specific Conductance	**110**		1.0	1.0	umhos/cm			05/06/19 10:15	1
Oxidation Reduction Potential	**460**		10	10	millivolts			05/06/19 10:15	1

Client Sample ID: TO-ISS-AK-03 T02

Lab Sample ID: 180-89564-11
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/08/19 17:43	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/08/19 17:43	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/08/19 17:43	1
o-Xylene	ND		1.0	0.41	ug/L			05/08/19 17:43	1
Toluene	ND		1.0	0.46	ug/L			05/08/19 17:43	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/08/19 17:43	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/08/19 17:43	1
Trichloroethene	**1.0**		1.0	0.69	ug/L			05/08/19 17:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*70 - 150*		*05/08/19 17:43*	*1*
4-Bromofluorobenzene (Surr)	*96*		*64 - 123*		*05/08/19 17:43*	*1*
Dibromofluoromethane (Surr)	*109*		*75 - 147*		*05/08/19 17:43*	*1*
Toluene-d8 (Surr)	*102*		*78 - 128*		*05/08/19 17:43*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.3**		0.1	0.1	SU			05/07/19 08:15	1
Specific Conductance	**400**		1.0	1.0	umhos/cm			05/07/19 08:15	1
Oxidation Reduction Potential	**130**		10	10	millivolts			05/07/19 08:15	1

Client Sample ID: TO-ISS-AK-03 T03

Lab Sample ID: 180-89564-12
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/09/19 10:54	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/09/19 10:54	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/09/19 10:54	1
o-Xylene	ND		1.0	0.41	ug/L			05/09/19 10:54	1
Toluene	ND		1.0	0.46	ug/L			05/09/19 10:54	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/09/19 10:54	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/09/19 10:54	1
Trichloroethene	**1.2**		1.0	0.69	ug/L			05/09/19 10:54	1

Client Sample ID: TO-ISS-AK-03 T03

Lab Sample ID: 180-89564-12

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	82		70 - 150		05/09/19 10:54	1
4-Bromofluorobenzene (Surr)	78		64 - 123		05/09/19 10:54	1
Dibromofluoromethane (Surr)	98		75 - 147		05/09/19 10:54	1
Toluene-d8 (Surr)	94		78 - 128		05/09/19 10:54	1

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.1**		0.1	0.1	SU			05/08/19 08:15	1
Specific Conductance	**270**		1.0	1.0	umhos/cm			05/08/19 08:15	1
Oxidation Reduction Potential	**160**		10	10	millivolts			05/08/19 08:15	1

Client Sample ID: TO-ISS-AK-03 T04

Lab Sample ID: 180-89564-13

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/13/19 13:53	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/13/19 13:53	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/13/19 13:53	1
o-Xylene	ND		1.0	0.41	ug/L			05/13/19 13:53	1
Toluene	ND		1.0	0.46	ug/L			05/13/19 13:53	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/13/19 13:53	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/13/19 13:53	1
Trichloroethene	**8.4**		1.0	0.69	ug/L			05/13/19 13:53	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	85		70 - 150		05/13/19 13:53	1
4-Bromofluorobenzene (Surr)	82		64 - 123		05/13/19 13:53	1
Dibromofluoromethane (Surr)	100		75 - 147		05/13/19 13:53	1
Toluene-d8 (Surr)	100		78 - 128		05/13/19 13:53	1

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.5**		0.1	0.1	SU			05/13/19 08:15	1
Specific Conductance	**690**		1.0	1.0	umhos/cm			05/13/19 08:15	1
Oxidation Reduction Potential	**130**		10	10	millivolts			05/13/19 08:15	1

Client Sample ID: TO-ISS-AK-03 T05

Lab Sample ID: 180-89564-14

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/20/19 15:06	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/20/19 15:06	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/20/19 15:06	1
o-Xylene	ND		1.0	0.41	ug/L			05/20/19 15:06	1
Toluene	ND		1.0	0.46	ug/L			05/20/19 15:06	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/20/19 15:06	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/20/19 15:06	1
Trichloroethene	**7.6**		1.0	0.69	ug/L			05/20/19 15:06	1

Client Sample ID: TO-ISS-AK-03 T05

Lab Sample ID: 180-89564-14

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	82		70 - 150		05/20/19 15:06	1
4-Bromofluorobenzene (Surr)	80		64 - 123		05/20/19 15:06	1
Dibromofluoromethane (Surr)	99		75 - 147		05/20/19 15:06	1
Toluene-d8 (Surr)	89		78 - 128		05/20/19 15:06	1

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.5**		0.1	0.1	SU			05/20/19 08:15	1
Specific Conductance	**690**		1.0	1.0	umhos/cm			05/20/19 08:15	1
Oxidation Reduction Potential	**94**		10	10	millivolts			05/20/19 08:15	1

Client Sample ID: TO-ISS-AK-03 T06

Lab Sample ID: 180-89564-15

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/03/19 15:53	1
Ethylbenzene	ND		1.0	0.51	ug/L			06/03/19 15:53	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			06/03/19 15:53	1
o-Xylene	ND		1.0	0.41	ug/L			06/03/19 15:53	1
Toluene	ND		1.0	0.46	ug/L			06/03/19 15:53	1
Xylenes, Total	ND		2.0	0.89	ug/L			06/03/19 15:53	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/03/19 15:53	1
Trichloroethene	**15**		1.0	0.69	ug/L			06/03/19 15:53	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	109		70 - 150		06/03/19 15:53	1
4-Bromofluorobenzene (Surr)	85		64 - 123		06/03/19 15:53	1
Dibromofluoromethane (Surr)	115		75 - 147		06/03/19 15:53	1
Toluene-d8 (Surr)	93		78 - 128		06/03/19 15:53	1

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.7**		0.1	0.1	SU			06/03/19 08:15	1
Specific Conductance	**880**		1.0	1.0	umhos/cm			06/03/19 08:15	1
Oxidation Reduction Potential	**130**		10	10	millivolts			06/03/19 08:15	1

Client Sample ID: TO-ISS-AK-03 T07

Lab Sample ID: 180-89564-16

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/17/19 17:33	1
Ethylbenzene	ND		1.0	0.51	ug/L			06/17/19 17:33	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			06/17/19 17:33	1
o-Xylene	ND		1.0	0.41	ug/L			06/17/19 17:33	1
Toluene	ND		1.0	0.46	ug/L			06/17/19 17:33	1
Xylenes, Total	ND		2.0	0.89	ug/L			06/17/19 17:33	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/17/19 17:33	1
Trichloroethene	**20**		1.0	0.69	ug/L			06/17/19 17:33	1

Client Sample ID: TO-ISS-AK-03 T07

Lab Sample ID: 180-89564-16

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	*111*		*70 - 150*		*06/17/19 17:33*	*1*
4-Bromofluorobenzene (Surr)	*107*		*64 - 123*		*06/17/19 17:33*	*1*
Dibromofluoromethane (Surr)	*125*		*75 - 147*		*06/17/19 17:33*	*1*
Toluene-d8 (Surr)	*110*		*78 - 128*		*06/17/19 17:33*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.5**		0.1	0.1	SU			06/17/19 08:15	1
Specific Conductance	**770**		1.0	1.0	umhos/cm			06/17/19 08:15	1
Oxidation Reduction Potential	**160**		10	10	millivolts			06/17/19 08:15	1

Client Sample ID: TO-ISS-AK-03 T08

Lab Sample ID: 180-89564-17

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/24/19 16:20	1
Ethylbenzene	ND		1.0	0.51	ug/L			06/24/19 16:20	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			06/24/19 16:20	1
o-Xylene	ND		1.0	0.41	ug/L			06/24/19 16:20	1
Toluene	ND		1.0	0.46	ug/L			06/24/19 16:20	1
Xylenes, Total	ND		2.0	0.89	ug/L			06/24/19 16:20	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/24/19 16:20	1
Trichloroethene	**9.2**		1.0	0.69	ug/L			06/24/19 16:20	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	*84*		*70 - 150*		*06/24/19 16:20*	*1*
4-Bromofluorobenzene (Surr)	*79*		*64 - 123*		*06/24/19 16:20*	*1*
Dibromofluoromethane (Surr)	*94*		*75 - 147*		*06/24/19 16:20*	*1*
Toluene-d8 (Surr)	*102*		*78 - 128*		*06/24/19 16:20*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.3**		0.1	0.1	SU			06/24/19 08:15	1
Specific Conductance	**460**		1.0	1.0	umhos/cm			06/24/19 08:15	1
Oxidation Reduction Potential	**180**		10	10	millivolts			06/24/19 08:15	1

Client Sample ID: TO-ISS-AK-03 T09

Lab Sample ID: 180-89564-18

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			07/10/19 14:07	1
Ethylbenzene	ND		1.0	0.51	ug/L			07/10/19 14:07	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			07/10/19 14:07	1
o-Xylene	ND		1.0	0.41	ug/L			07/10/19 14:07	1
Toluene	ND		1.0	0.46	ug/L			07/10/19 14:07	1
Xylenes, Total	ND		2.0	0.89	ug/L			07/10/19 14:07	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			07/10/19 14:07	1
Trichloroethene	**11**		1.0	0.69	ug/L			07/10/19 14:07	1

Client Sample ID: TO-ISS-AK-03 T09

Lab Sample ID: 180-89564-18

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*79*		*70 - 150*		*07/10/19 14:07*	*1*
4-Bromofluorobenzene (Surr)	*89*		*64 - 123*		*07/10/19 14:07*	*1*
Dibromofluoromethane (Surr)	*94*		*75 - 147*		*07/10/19 14:07*	*1*
Toluene-d8 (Surr)	*103*		*78 - 128*		*07/10/19 14:07*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.2**		0.1	0.1	SU			07/08/19 08:20	1
Specific Conductance	**410**		1.0	1.0	umhos/cm			07/08/19 08:20	1
Oxidation Reduction Potential	**170**		10	10	millivolts			07/08/19 08:20	1

Client Sample ID: TO-ISS-BT-01 T01

Lab Sample ID: 180-89564-19

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/08/19 16:28	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/08/19 16:28	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/08/19 16:28	1
o-Xylene	ND		1.0	0.41	ug/L			05/08/19 16:28	1
Toluene	ND		1.0	0.46	ug/L			05/08/19 16:28	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/08/19 16:28	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/08/19 16:28	1
Trichloroethene	ND		1.0	0.69	ug/L			05/08/19 16:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*88*		*70 - 150*		*05/08/19 16:28*	*1*
4-Bromofluorobenzene (Surr)	*89*		*64 - 123*		*05/08/19 16:28*	*1*
Dibromofluoromethane (Surr)	*102*		*75 - 147*		*05/08/19 16:28*	*1*
Toluene-d8 (Surr)	*97*		*78 - 128*		*05/08/19 16:28*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**19.7**		0.1	0.1	%			05/07/19 12:36	1
Percent Solids	**80.3**		0.1	0.1	%			05/07/19 12:36	1

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**10.9**		0.1	0.1	SU			05/06/19 10:15	1
Specific Conductance	**300**		1.0	1.0	umhos/cm			05/06/19 10:15	1
Oxidation Reduction Potential	**230**		10	10	millivolts			05/06/19 10:15	1

Client Sample ID: TO-ISS-BT-01 T02

Lab Sample ID: 180-89564-20

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/08/19 18:08	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/08/19 18:08	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/08/19 18:08	1

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Client Sample ID: TO-ISS-BT-01 T02

Lab Sample ID: 180-89564-20
Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Xylene	ND		1.0	0.41	ug/L			05/08/19 18:08	1
Toluene	ND		1.0	0.46	ug/L			05/08/19 18:08	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/08/19 18:08	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/08/19 18:08	1
Trichloroethene	ND		1.0	0.69	ug/L			05/08/19 18:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*70 - 150*		*05/08/19 18:08*	*1*
4-Bromofluorobenzene (Surr)	*98*		*64 - 123*		*05/08/19 18:08*	*1*
Dibromofluoromethane (Surr)	*115*		*75 - 147*		*05/08/19 18:08*	*1*
Toluene-d8 (Surr)	*107*		*78 - 128*		*05/08/19 18:08*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.7**		0.1	0.1	SU			05/07/19 08:15	1
Specific Conductance	**900**		1.0	1.0	umhos/cm			05/07/19 08:15	1
Oxidation Reduction Potential	**130**		10	10	millivolts			05/07/19 08:15	1

Client Sample ID: TO-ISS-BT-01 T03

Lab Sample ID: 180-89564-21
Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/09/19 10:29	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/09/19 10:29	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/09/19 10:29	1
o-Xylene	ND		1.0	0.41	ug/L			05/09/19 10:29	1
Toluene	ND		1.0	0.46	ug/L			05/09/19 10:29	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/09/19 10:29	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/09/19 10:29	1
Trichloroethene	ND		1.0	0.69	ug/L			05/09/19 10:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*84*		*70 - 150*		*05/09/19 10:29*	*1*
4-Bromofluorobenzene (Surr)	*84*		*64 - 123*		*05/09/19 10:29*	*1*
Dibromofluoromethane (Surr)	*101*		*75 - 147*		*05/09/19 10:29*	*1*
Toluene-d8 (Surr)	*95*		*78 - 128*		*05/09/19 10:29*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.6**		0.1	0.1	SU			05/08/19 08:15	1
Specific Conductance	**750**		1.0	1.0	umhos/cm			05/08/19 08:15	1
Oxidation Reduction Potential	**150**		10	10	millivolts			05/08/19 08:15	1

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Client Sample ID: TO-ISS-BT-01 T04

Lab Sample ID: 180-89564-22

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/13/19 13:03	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/13/19 13:03	1
m-Xylene & p-Xylene	**0.92**	**J**	1.0	0.48	ug/L			05/13/19 13:03	1
o-Xylene	**1.8**		1.0	0.41	ug/L			05/13/19 13:03	1
Toluene	ND		1.0	0.46	ug/L			05/13/19 13:03	1
Xylenes, Total	**2.8**		2.0	0.89	ug/L			05/13/19 13:03	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/13/19 13:03	1
Trichloroethene	ND		1.0	0.69	ug/L			05/13/19 13:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*70 - 150*		*05/13/19 13:03*	*1*
4-Bromofluorobenzene (Surr)	*88*		*64 - 123*		*05/13/19 13:03*	*1*
Dibromofluoromethane (Surr)	*105*		*75 - 147*		*05/13/19 13:03*	*1*
Toluene-d8 (Surr)	*102*		*78 - 128*		*05/13/19 13:03*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.9**		0.1	0.1	SU			05/13/19 08:15	1
Specific Conductance	**1400**		1.0	1.0	umhos/cm			05/13/19 08:15	1
Oxidation Reduction Potential	**130**		10	10	millivolts			05/13/19 08:15	1

Client Sample ID: TO-ISS-BT-01 T05

Lab Sample ID: 180-89564-23

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/20/19 15:56	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/20/19 15:56	1
m-Xylene & p-Xylene	**1.1**		1.0	0.48	ug/L			05/20/19 15:56	1
o-Xylene	**1.9**		1.0	0.41	ug/L			05/20/19 15:56	1
Toluene	ND		1.0	0.46	ug/L			05/20/19 15:56	1
Xylenes, Total	**2.9**		2.0	0.89	ug/L			05/20/19 15:56	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/20/19 15:56	1
Trichloroethene	ND		1.0	0.69	ug/L			05/20/19 15:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*81*		*70 - 150*		*05/20/19 15:56*	*1*
4-Bromofluorobenzene (Surr)	*99*		*64 - 123*		*05/20/19 15:56*	*1*
Dibromofluoromethane (Surr)	*100*		*75 - 147*		*05/20/19 15:56*	*1*
Toluene-d8 (Surr)	*92*		*78 - 128*		*05/20/19 15:56*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.8**		0.1	0.1	SU			05/20/19 08:15	1
Specific Conductance	**1400**		1.0	1.0	umhos/cm			05/20/19 08:15	1
Oxidation Reduction Potential	**110**		10	10	millivolts			05/20/19 08:15	1

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Client Sample ID: TO-ISS-BT-01 T06

Lab Sample ID: 180-89564-24

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/03/19 16:42	1
Ethylbenzene	**0.56**	**J**	1.0	0.51	ug/L			06/03/19 16:42	1
m-Xylene & p-Xylene	**1.6**		1.0	0.48	ug/L			06/03/19 16:42	1
o-Xylene	**3.1**		1.0	0.41	ug/L			06/03/19 16:42	1
Toluene	ND		1.0	0.46	ug/L			06/03/19 16:42	1
Xylenes, Total	**4.7**		2.0	0.89	ug/L			06/03/19 16:42	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/03/19 16:42	1
Trichloroethene	ND		1.0	0.69	ug/L			06/03/19 16:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*70 - 150*		*06/03/19 16:42*	*1*
4-Bromofluorobenzene (Surr)	*92*		*64 - 123*		*06/03/19 16:42*	*1*
Dibromofluoromethane (Surr)	*104*		*75 - 147*		*06/03/19 16:42*	*1*
Toluene-d8 (Surr)	*90*		*78 - 128*		*06/03/19 16:42*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**12.0**		0.1	0.1	SU			06/03/19 08:15	1
Specific Conductance	**1600**		1.0	1.0	umhos/cm			06/03/19 08:15	1
Oxidation Reduction Potential	**110**		10	10	millivolts			06/03/19 08:15	1

Client Sample ID: TO-ISS-BT-01 T07

Lab Sample ID: 180-89564-25

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/17/19 17:58	1
Ethylbenzene	**1.1**		1.0	0.51	ug/L			06/17/19 17:58	1
m-Xylene & p-Xylene	**3.0**		1.0	0.48	ug/L			06/17/19 17:58	1
o-Xylene	**6.0**		1.0	0.41	ug/L			06/17/19 17:58	1
Toluene	ND		1.0	0.46	ug/L			06/17/19 17:58	1
Xylenes, Total	**9.0**		2.0	0.89	ug/L			06/17/19 17:58	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/17/19 17:58	1
Trichloroethene	ND		1.0	0.69	ug/L			06/17/19 17:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*106*		*70 - 150*		*06/17/19 17:58*	*1*
4-Bromofluorobenzene (Surr)	*114*		*64 - 123*		*06/17/19 17:58*	*1*
Dibromofluoromethane (Surr)	*129*		*75 - 147*		*06/17/19 17:58*	*1*
Toluene-d8 (Surr)	*115*		*78 - 128*		*06/17/19 17:58*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.8**		0.1	0.1	SU			06/17/19 08:15	1
Specific Conductance	**1300**		1.0	1.0	umhos/cm			06/17/19 08:15	1
Oxidation Reduction Potential	**140**		10	10	millivolts			06/17/19 08:15	1

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Client Sample ID: TO-ISS-BT-01 T08

Lab Sample ID: 180-89564-26

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/24/19 15:56	1
Ethylbenzene	ND		1.0	0.51	ug/L			06/24/19 15:56	1
m-Xylene & p-Xylene	**1.3**		1.0	0.48	ug/L			06/24/19 15:56	1
o-Xylene	**1.9**		1.0	0.41	ug/L			06/24/19 15:56	1
Toluene	ND		1.0	0.46	ug/L			06/24/19 15:56	1
Xylenes, Total	**3.2**		2.0	0.89	ug/L			06/24/19 15:56	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/24/19 15:56	1
Trichloroethene	ND		1.0	0.69	ug/L			06/24/19 15:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*84*		*70 - 150*		*06/24/19 15:56*	*1*
4-Bromofluorobenzene (Surr)	*80*		*64 - 123*		*06/24/19 15:56*	*1*
Dibromofluoromethane (Surr)	*99*		*75 - 147*		*06/24/19 15:56*	*1*
Toluene-d8 (Surr)	*99*		*78 - 128*		*06/24/19 15:56*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.6**		0.1	0.1	SU			06/24/19 08:15	1
Specific Conductance	**860**		1.0	1.0	umhos/cm			06/24/19 08:15	1
Oxidation Reduction Potential	**160**		10	10	millivolts			06/24/19 08:15	1

Client Sample ID: TO-ISS-BT-01 T09

Lab Sample ID: 180-89564-27

Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			07/10/19 14:33	1
Ethylbenzene	**0.83**	**J**	1.0	0.51	ug/L			07/10/19 14:33	1
m-Xylene & p-Xylene	**2.1**		1.0	0.48	ug/L			07/10/19 14:33	1
o-Xylene	**4.5**	**F1**	1.0	0.41	ug/L			07/10/19 14:33	1
Toluene	ND		1.0	0.46	ug/L			07/10/19 14:33	1
Xylenes, Total	**6.6**	**F1**	2.0	0.89	ug/L			07/10/19 14:33	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			07/10/19 14:33	1
Trichloroethene	ND		1.0	0.69	ug/L			07/10/19 14:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*83*		*70 - 150*		*07/10/19 14:33*	*1*
4-Bromofluorobenzene (Surr)	*104*		*64 - 123*		*07/10/19 14:33*	*1*
Dibromofluoromethane (Surr)	*102*		*75 - 147*		*07/10/19 14:33*	*1*
Toluene-d8 (Surr)	*117*		*78 - 128*		*07/10/19 14:33*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.5**		0.1	0.1	SU			07/08/19 08:20	1
Specific Conductance	**720**		1.0	1.0	umhos/cm			07/08/19 08:20	1
Oxidation Reduction Potential	**140**		10	10	millivolts			07/08/19 08:20	1

Client Sample ID: TO-ISS-BT-03 T01

Lab Sample ID: 180-89564-28

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/08/19 16:53	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/08/19 16:53	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/08/19 16:53	1
o-Xylene	ND		1.0	0.41	ug/L			05/08/19 16:53	1
Toluene	ND		1.0	0.46	ug/L			05/08/19 16:53	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/08/19 16:53	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/08/19 16:53	1
Trichloroethene	ND		1.0	0.69	ug/L			05/08/19 16:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*70 - 150*		*05/08/19 16:53*	*1*
4-Bromofluorobenzene (Surr)	*92*		*64 - 123*		*05/08/19 16:53*	*1*
Dibromofluoromethane (Surr)	*110*		*75 - 147*		*05/08/19 16:53*	*1*
Toluene-d8 (Surr)	*110*		*78 - 128*		*05/08/19 16:53*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**19.7**		0.1	0.1	%			05/07/19 12:36	1
Percent Solids	**80.3**		0.1	0.1	%			05/07/19 12:36	1

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**10.5**		0.1	0.1	SU			05/06/19 10:15	1
Specific Conductance	**140**		1.0	1.0	umhos/cm			05/06/19 10:15	1
Oxidation Reduction Potential	**230**		10	10	millivolts			05/06/19 10:15	1

Client Sample ID: TO-ISS-BT-03 T02

Lab Sample ID: 180-89564-29

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/08/19 18:33	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/08/19 18:33	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/08/19 18:33	1
o-Xylene	ND		1.0	0.41	ug/L			05/08/19 18:33	1
Toluene	ND		1.0	0.46	ug/L			05/08/19 18:33	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/08/19 18:33	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/08/19 18:33	1
Trichloroethene	ND		1.0	0.69	ug/L			05/08/19 18:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*114*		*70 - 150*		*05/08/19 18:33*	*1*
4-Bromofluorobenzene (Surr)	*109*		*64 - 123*		*05/08/19 18:33*	*1*
Dibromofluoromethane (Surr)	*127*		*75 - 147*		*05/08/19 18:33*	*1*
Toluene-d8 (Surr)	*118*		*78 - 128*		*05/08/19 18:33*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.3**		0.1	0.1	SU			05/07/19 08:15	1
Specific Conductance	**350**		1.0	1.0	umhos/cm			05/07/19 08:15	1

Client Sample ID: TO-ISS-BT-03 T02

Lab Sample ID: 180-89564-29

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

General Chemistry - Leach (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Oxidation Reduction Potential	**140**		10	10	millivolts			05/07/19 08:15	1

Client Sample ID: TO-ISS-BT-03 T03

Lab Sample ID: 180-89564-30

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/09/19 10:04	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/09/19 10:04	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/09/19 10:04	1
o-Xylene	ND		1.0	0.41	ug/L			05/09/19 10:04	1
Toluene	ND		1.0	0.46	ug/L			05/09/19 10:04	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/09/19 10:04	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/09/19 10:04	1
Trichloroethene	ND		1.0	0.69	ug/L			05/09/19 10:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*82*		*70 - 150*		*05/09/19 10:04*	*1*
4-Bromofluorobenzene (Surr)	*85*		*64 - 123*		*05/09/19 10:04*	*1*
Dibromofluoromethane (Surr)	*102*		*75 - 147*		*05/09/19 10:04*	*1*
Toluene-d8 (Surr)	*99*		*78 - 128*		*05/09/19 10:04*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.2**		0.1	0.1	SU			05/08/19 08:15	1
Specific Conductance	**280**		1.0	1.0	umhos/cm			05/08/19 08:15	1
Oxidation Reduction Potential	**170**		10	10	millivolts			05/08/19 08:15	1

Client Sample ID: TO-ISS-BT-03 T04

Lab Sample ID: 180-89564-31

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/13/19 13:28	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/13/19 13:28	1
m-Xylene & p-Xylene	**0.56**	**J**	1.0	0.48	ug/L			05/13/19 13:28	1
o-Xylene	**1.3**		1.0	0.41	ug/L			05/13/19 13:28	1
Toluene	ND		1.0	0.46	ug/L			05/13/19 13:28	1
Xylenes, Total	**1.9**	**J**	2.0	0.89	ug/L			05/13/19 13:28	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/13/19 13:28	1
Trichloroethene	ND		1.0	0.69	ug/L			05/13/19 13:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*81*		*70 - 150*		*05/13/19 13:28*	*1*
4-Bromofluorobenzene (Surr)	*84*		*64 - 123*		*05/13/19 13:28*	*1*
Dibromofluoromethane (Surr)	*100*		*75 - 147*		*05/13/19 13:28*	*1*
Toluene-d8 (Surr)	*99*		*78 - 128*		*05/13/19 13:28*	*1*

Client Sample ID: TO-ISS-BT-03 T04

Lab Sample ID: 180-89564-31
Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.5**		0.1	0.1	SU			05/13/19 08:15	1
Specific Conductance	**590**		1.0	1.0	umhos/cm			05/13/19 08:15	1
Oxidation Reduction Potential	**95**		10	10	millivolts			05/13/19 08:15	1

Client Sample ID: TO-ISS-BT-03 T05

Lab Sample ID: 180-89564-32
Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/20/19 16:46	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/20/19 16:46	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/20/19 16:46	1
o-Xylene	**1.1**		1.0	0.41	ug/L			05/20/19 16:46	1
Toluene	ND		1.0	0.46	ug/L			05/20/19 16:46	1
Xylenes, Total	**1.1**	**J**	2.0	0.89	ug/L			05/20/19 16:46	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/20/19 16:46	1
Trichloroethene	ND		1.0	0.69	ug/L			05/20/19 16:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*88*		*70 - 150*		*05/20/19 16:46*	*1*
4-Bromofluorobenzene (Surr)	*87*		*64 - 123*		*05/20/19 16:46*	*1*
Dibromofluoromethane (Surr)	*98*		*75 - 147*		*05/20/19 16:46*	*1*
Toluene-d8 (Surr)	*83*		*78 - 128*		*05/20/19 16:46*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.5**		0.1	0.1	SU			05/20/19 08:15	1
Specific Conductance	**590**		1.0	1.0	umhos/cm			05/20/19 08:15	1
Oxidation Reduction Potential	**92**		10	10	millivolts			05/20/19 08:15	1

Client Sample ID: TO-ISS-BT-03 T06

Lab Sample ID: 180-89564-33
Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/03/19 17:32	1
Ethylbenzene	ND		1.0	0.51	ug/L			06/03/19 17:32	1
m-Xylene & p-Xylene	**0.66**	**J**	1.0	0.48	ug/L			06/03/19 17:32	1
o-Xylene	**1.4**		1.0	0.41	ug/L			06/03/19 17:32	1
Toluene	ND		1.0	0.46	ug/L			06/03/19 17:32	1
Xylenes, Total	**2.1**		2.0	0.89	ug/L			06/03/19 17:32	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/03/19 17:32	1
Trichloroethene	ND		1.0	0.69	ug/L			06/03/19 17:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*70 - 150*		*06/03/19 17:32*	*1*
4-Bromofluorobenzene (Surr)	*84*		*64 - 123*		*06/03/19 17:32*	*1*
Dibromofluoromethane (Surr)	*107*		*75 - 147*		*06/03/19 17:32*	*1*
Toluene-d8 (Surr)	*88*		*78 - 128*		*06/03/19 17:32*	*1*

Client Sample ID: TO-ISS-BT-03 T06

Lab Sample ID: 180-89564-33

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.7**		0.1	0.1	SU			06/03/19 08:15	1
Specific Conductance	**740**		1.0	1.0	umhos/cm			06/03/19 08:15	1
Oxidation Reduction Potential	**130**		10	10	millivolts			06/03/19 08:15	1

Client Sample ID: TO-ISS-BT-03 T07

Lab Sample ID: 180-89564-34

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/17/19 18:23	1
Ethylbenzene	ND		1.0	0.51	ug/L			06/17/19 18:23	1
m-Xylene & p-Xylene	**0.49**	**J**	1.0	0.48	ug/L			06/17/19 18:23	1
o-Xylene	**1.2**		1.0	0.41	ug/L			06/17/19 18:23	1
Toluene	ND		1.0	0.46	ug/L			06/17/19 18:23	1
Xylenes, Total	**1.7**	**J**	2.0	0.89	ug/L			06/17/19 18:23	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/17/19 18:23	1
Trichloroethene	ND		1.0	0.69	ug/L			06/17/19 18:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*84*		*70 - 150*		*06/17/19 18:23*	*1*
4-Bromofluorobenzene (Surr)	*91*		*64 - 123*		*06/17/19 18:23*	*1*
Dibromofluoromethane (Surr)	*100*		*75 - 147*		*06/17/19 18:23*	*1*
Toluene-d8 (Surr)	*93*		*78 - 128*		*06/17/19 18:23*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.5**		0.1	0.1	SU			06/17/19 08:15	1
Specific Conductance	**630**		1.0	1.0	umhos/cm			06/17/19 08:15	1
Oxidation Reduction Potential	**150**		10	10	millivolts			06/17/19 08:15	1

Client Sample ID: TO-ISS-BT-03 T08

Lab Sample ID: 180-89564-35

Date Collected: 04/26/19 00:00

Matrix: Solid

Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/24/19 15:32	1
Ethylbenzene	ND		1.0	0.51	ug/L			06/24/19 15:32	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			06/24/19 15:32	1
o-Xylene	**0.73**	**J**	1.0	0.41	ug/L			06/24/19 15:32	1
Toluene	ND		1.0	0.46	ug/L			06/24/19 15:32	1
Xylenes, Total	**1.1**	**J**	2.0	0.89	ug/L			06/24/19 15:32	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/24/19 15:32	1
Trichloroethene	ND		1.0	0.69	ug/L			06/24/19 15:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*82*		*70 - 150*		*06/24/19 15:32*	*1*
4-Bromofluorobenzene (Surr)	*85*		*64 - 123*		*06/24/19 15:32*	*1*
Dibromofluoromethane (Surr)	*96*		*75 - 147*		*06/24/19 15:32*	*1*
Toluene-d8 (Surr)	*103*		*78 - 128*		*06/24/19 15:32*	*1*

Client Sample ID: TO-ISS-BT-03 T08

Lab Sample ID: 180-89564-35
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.3**		0.1	0.1	SU			06/24/19 08:15	1
Specific Conductance	**370**		1.0	1.0	umhos/cm			06/24/19 08:15	1
Oxidation Reduction Potential	**180**		10	10	millivolts			06/24/19 08:15	1

Client Sample ID: TO-ISS-BT-03 T09

Lab Sample ID: 180-89564-36
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			07/10/19 14:58	1
Ethylbenzene	ND		1.0	0.51	ug/L			07/10/19 14:58	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			07/10/19 14:58	1
o-Xylene	**0.99**	**J**	1.0	0.41	ug/L			07/10/19 14:58	1
Toluene	ND		1.0	0.46	ug/L			07/10/19 14:58	1
Xylenes, Total	**0.99**	**J**	2.0	0.89	ug/L			07/10/19 14:58	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			07/10/19 14:58	1
Trichloroethene	ND		1.0	0.69	ug/L			07/10/19 14:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*85*		*70 - 150*		*07/10/19 14:58*	*1*
4-Bromofluorobenzene (Surr)	*98*		*64 - 123*		*07/10/19 14:58*	*1*
Dibromofluoromethane (Surr)	*99*		*75 - 147*		*07/10/19 14:58*	*1*
Toluene-d8 (Surr)	*107*		*78 - 128*		*07/10/19 14:58*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**11.2**		0.1	0.1	SU			07/08/19 08:20	1
Specific Conductance	**340**		1.0	1.0	umhos/cm			07/08/19 08:20	1
Oxidation Reduction Potential	**160**		10	10	millivolts			07/08/19 08:20	1

Client Sample ID: TO-ISS-AK-01 T01

Lab Sample ID: 180-89564-37
Matrix: Water
Date Collected: 05/06/19 05:00
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/10/19 23:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*97*		*56 - 120*		*05/10/19 23:02*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/09/19 10:18	05/10/19 18:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*81*		*37 - 130*	*05/09/19 10:18*	*05/10/19 18:33*	*1*

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Client Sample ID: TO-ISS-AK-01 T02

Lab Sample ID: 180-89564-38
Matrix: Water
Date Collected: 05/07/19 05:00
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/11/19 00:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*93*		*56 - 120*		*05/11/19 00:32*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/09/19 10:18	05/10/19 19:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*78*		*37 - 130*	*05/09/19 10:18*	*05/10/19 19:00*	*1*

Client Sample ID: TO-ISS-AK-01 T03

Lab Sample ID: 180-89564-39
Matrix: Water
Date Collected: 05/08/19 05:00
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/11/19 01:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*88*		*56 - 120*		*05/11/19 01:08*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/10/19 11:51	05/13/19 18:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*76*		*37 - 130*	*05/10/19 11:51*	*05/13/19 18:56*	*1*

Client Sample ID: TO-ISS-AK-01 T04

Lab Sample ID: 180-89564-40
Matrix: Water
Date Collected: 05/13/19 05:00
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/15/19 13:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*88*		*56 - 120*		*05/15/19 13:38*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/15/19 10:38	05/16/19 20:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*80*		*37 - 130*	*05/15/19 10:38*	*05/16/19 20:07*	*1*

Client Sample ID: TO-ISS-AK-01 T05

Lab Sample ID: 180-89564-41

Date Collected: 05/20/19 05:00
Matrix: Water
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	50	J	100	49	ug/L			05/22/19 20:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*100*		*56 - 120*		*05/22/19 20:21*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/22/19 08:46	05/24/19 02:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*88*		*37 - 130*	*05/22/19 08:46*	*05/24/19 02:53*	*1*

Client Sample ID: TO-ISS-AK-01 T06

Lab Sample ID: 180-89564-42

Date Collected: 06/03/19 05:00
Matrix: Water
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			06/06/19 14:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*84*		*56 - 120*		*06/06/19 14:36*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	290	J	450	200	ug/L		06/05/19 11:29	06/08/19 03:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*79*		*37 - 130*	*06/05/19 11:29*	*06/08/19 03:28*	*1*

Client Sample ID: TO-ISS-AK-01 T07

Lab Sample ID: 180-89564-43

Date Collected: 06/17/19 05:00
Matrix: Water
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	55	J	100	49	ug/L			06/21/19 17:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*95*		*56 - 120*		*06/21/19 17:48*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	240	J	450	200	ug/L		06/20/19 13:55	06/24/19 21:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*76*		*37 - 130*	*06/20/19 13:55*	*06/24/19 21:12*	*1*

Client Sample ID: TO-ISS-AK-01 T08

Lab Sample ID: 180-89564-44
Matrix: Water
Date Collected: 06/24/19 05:00
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			06/26/19 19:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*90*		*56 - 120*		*06/26/19 19:36*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	230	J	460	210	ug/L		06/26/19 14:28	06/27/19 23:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*81*		*37 - 130*	*06/26/19 14:28*	*06/27/19 23:23*	*1*

Client Sample ID: TO-ISS-AK-01 T09

Lab Sample ID: 180-89564-45
Matrix: Water
Date Collected: 07/08/19 05:00
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			07/10/19 11:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*96*		*56 - 120*		*07/10/19 11:30*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	240	J	460	210	ug/L		07/15/19 14:52	07/17/19 07:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*93*		*37 - 130*	*07/15/19 14:52*	*07/17/19 07:23*	*1*

Client Sample ID: TO-ISS-AK-03 T01

Lab Sample ID: 180-89564-46
Matrix: Water
Date Collected: 05/06/19 05:05
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/10/19 23:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*94*		*56 - 120*		*05/10/19 23:40*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/09/19 10:18	05/10/19 19:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*84*		*37 - 130*	*05/09/19 10:18*	*05/10/19 19:27*	*1*

Client Sample ID: TO-ISS-AK-03 T02

Lab Sample ID: 180-89564-47

Date Collected: 05/07/19 05:05

Matrix: Water

Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/11/19 01:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*85*		*56 - 120*		*05/11/19 01:44*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/09/19 10:18	05/10/19 19:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*86*		*37 - 130*	*05/09/19 10:18*	*05/10/19 19:55*	*1*

Client Sample ID: TO-ISS-AK-03 T03

Lab Sample ID: 180-89564-48

Date Collected: 05/08/19 05:05

Matrix: Water

Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/11/19 03:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*88*		*56 - 120*		*05/11/19 03:31*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/10/19 11:51	05/13/19 19:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*79*		*37 - 130*	*05/10/19 11:51*	*05/13/19 19:24*	*1*

Client Sample ID: TO-ISS-AK-03 T04

Lab Sample ID: 180-89564-49

Date Collected: 05/13/19 05:05

Matrix: Water

Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/15/19 15:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*89*		*56 - 120*		*05/15/19 15:32*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/15/19 10:38	05/16/19 20:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*71*		*37 - 130*	*05/15/19 10:38*	*05/16/19 20:34*	*1*

Client Sample ID: TO-ISS-AK-03 T05

Lab Sample ID: 180-89564-50
Matrix: Water
Date Collected: 05/20/19 05:05
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/22/19 21:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*90*		*56 - 120*		*05/22/19 21:03*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/22/19 08:46	05/24/19 03:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*87*		*37 - 130*	*05/22/19 08:46*	*05/24/19 03:20*	*1*

Client Sample ID: TO-ISS-AK-03 T06

Lab Sample ID: 180-89564-51
Matrix: Water
Date Collected: 06/03/19 05:05
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			06/06/19 15:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*84*		*56 - 120*		*06/06/19 15:15*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	240	J	450	200	ug/L		06/05/19 11:29	06/08/19 03:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*72*		*37 - 130*	*06/05/19 11:29*	*06/08/19 03:55*	*1*

Client Sample ID: TO-ISS-AK-03 T07

Lab Sample ID: 180-89564-52
Matrix: Water
Date Collected: 06/17/19 05:05
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			06/21/19 19:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*93*		*56 - 120*		*06/21/19 19:47*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	230	J	450	200	ug/L		06/20/19 13:55	06/24/19 21:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*78*		*37 - 130*	*06/20/19 13:55*	*06/24/19 21:39*	*1*

Client Sample ID: TO-ISS-AK-03 T08

Lab Sample ID: 180-89564-53

Date Collected: 06/24/19 05:05

Matrix: Water

Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			06/26/19 20:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*93*		*56 - 120*		*06/26/19 20:19*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		06/26/19 14:28	06/27/19 23:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*77*		*37 - 130*	*06/26/19 14:28*	*06/27/19 23:50*	*1*

Client Sample ID: TO-ISS-AK-03 T09

Lab Sample ID: 180-89564-54

Date Collected: 07/08/19 05:05

Matrix: Water

Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			07/10/19 13:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*91*		*56 - 120*		*07/10/19 13:43*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		460	210	ug/L		07/15/19 14:52	07/17/19 07:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*96*		*37 - 130*	*07/15/19 14:52*	*07/17/19 07:50*	*1*

Client Sample ID: TO-ISS-BT-01 T01

Lab Sample ID: 180-89564-55

Date Collected: 05/06/19 05:10

Matrix: Water

Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/11/19 00:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*93*		*56 - 120*		*05/11/19 00:19*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/09/19 10:18	05/10/19 20:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*85*		*37 - 130*	*05/09/19 10:18*	*05/10/19 20:22*	*1*

Client Sample ID: TO-ISS-BT-01 T02

Lab Sample ID: 180-89564-56
Matrix: Water
Date Collected: 05/07/19 05:10
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/11/19 04:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*94*		*56 - 120*		*05/11/19 04:08*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	390	J	450	200	ug/L		05/09/19 10:18	05/10/19 20:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*83*		*37 - 130*	*05/09/19 10:18*	*05/10/19 20:49*	*1*

Client Sample ID: TO-ISS-BT-01 T03

Lab Sample ID: 180-89564-57
Matrix: Water
Date Collected: 05/08/19 05:10
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/11/19 04:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*89*		*56 - 120*		*05/11/19 04:44*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	220	J	450	200	ug/L		05/10/19 11:51	05/13/19 19:51	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*78*		*37 - 130*	*05/10/19 11:51*	*05/13/19 19:51*	*1*

Client Sample ID: TO-ISS-BT-01 T04

Lab Sample ID: 180-89564-58
Matrix: Water
Date Collected: 05/13/19 05:10
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/15/19 16:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*88*		*56 - 120*		*05/15/19 16:11*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	530		450	200	ug/L		05/15/19 10:38	05/16/19 21:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*83*		*37 - 130*	*05/15/19 10:38*	*05/16/19 21:01*	*1*

Client Sample ID: TO-ISS-BT-01 T05

Lab Sample ID: 180-89564-59

Date Collected: 05/20/19 05:10
Matrix: Water
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	82	J	100	49	ug/L			05/22/19 21:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*95*		*56 - 120*		*05/22/19 21:44*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	480		450	200	ug/L		05/22/19 08:46	05/24/19 03:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*93*		*37 - 130*	*05/22/19 08:46*	*05/24/19 03:47*	*1*

Client Sample ID: TO-ISS-BT-01 T06

Lab Sample ID: 180-89564-60

Date Collected: 06/03/19 05:10
Matrix: Water
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	96	J	100	49	ug/L			06/06/19 15:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*86*		*56 - 120*		*06/06/19 15:53*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	660		450	200	ug/L		06/05/19 11:29	06/08/19 04:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*83*		*37 - 130*	*06/05/19 11:29*	*06/08/19 04:22*	*1*

Client Sample ID: TO-ISS-BT-01 T07

Lab Sample ID: 180-89564-61

Date Collected: 06/17/19 05:10
Matrix: Water
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	160		100	49	ug/L			06/21/19 20:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*96*		*56 - 120*		*06/21/19 20:26*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	540		450	200	ug/L		06/20/19 13:55	06/24/19 22:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*82*		*37 - 130*	*06/20/19 13:55*	*06/24/19 22:07*	*1*

Client Sample ID: TO-ISS-BT-01 T08

Lab Sample ID: 180-89564-62

Date Collected: 06/24/19 05:10

Matrix: Water

Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			06/26/19 21:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*89*		*56 - 120*		*06/26/19 21:04*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	**400**	**J**	450	200	ug/L		06/26/19 14:28	06/28/19 00:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*76*		*37 - 130*	*06/26/19 14:28*	*06/28/19 00:18*	*1*

Client Sample ID: TO-ISS-BT-01 T09

Lab Sample ID: 180-89564-63

Date Collected: 07/08/19 05:10

Matrix: Water

Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	**110**		100	49	ug/L			07/10/19 14:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*96*		*56 - 120*		*07/10/19 14:31*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	**590**		460	210	ug/L		07/15/19 14:52	07/17/19 08:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*92*		*37 - 130*	*07/15/19 14:52*	*07/17/19 08:18*	*1*

Client Sample ID: TO-ISS-BT-03 T01

Lab Sample ID: 180-89564-64

Date Collected: 05/06/19 05:15

Matrix: Water

Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/11/19 00:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*92*		*56 - 120*		*05/11/19 00:57*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/09/19 10:18	05/10/19 21:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*85*		*37 - 130*	*05/09/19 10:18*	*05/10/19 21:16*	*1*

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Client Sample ID: TO-ISS-BT-03 T02

Lab Sample ID: 180-89564-65
Matrix: Water
Date Collected: 05/07/19 05:15
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/11/19 05:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*89*		*56 - 120*		*05/11/19 05:20*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/09/19 10:18	05/10/19 21:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*82*		*37 - 130*	*05/09/19 10:18*	*05/10/19 21:43*	*1*

Client Sample ID: TO-ISS-BT-03 T03

Lab Sample ID: 180-89564-66
Matrix: Water
Date Collected: 05/08/19 05:15
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/11/19 05:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*90*		*56 - 120*		*05/11/19 05:56*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/10/19 11:51	05/13/19 20:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*78*		*37 - 130*	*05/10/19 11:51*	*05/13/19 20:18*	*1*

Client Sample ID: TO-ISS-BT-03 T04

Lab Sample ID: 180-89564-67
Matrix: Water
Date Collected: 05/13/19 05:15
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/15/19 16:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*93*		*56 - 120*		*05/15/19 16:48*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	240	J	450	200	ug/L		05/15/19 10:38	05/16/19 21:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*83*		*37 - 130*	*05/15/19 10:38*	*05/16/19 21:56*	*1*

Client Sample ID: TO-ISS-BT-03 T05

Lab Sample ID: 180-89564-68
Matrix: Water
Date Collected: 05/20/19 05:15
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	70	J	100	49	ug/L			05/22/19 23:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*91*		*56 - 120*		*05/22/19 23:48*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/22/19 08:46	05/24/19 04:14	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*89*		*37 - 130*	*05/22/19 08:46*	*05/24/19 04:14*	*1*

Client Sample ID: TO-ISS-BT-03 T06

Lab Sample ID: 180-89564-69
Matrix: Water
Date Collected: 06/03/19 05:15
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	50	J	100	49	ug/L			06/06/19 16:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*87*		*56 - 120*		*06/06/19 16:31*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	320	J	450	200	ug/L		06/05/19 11:29	06/08/19 04:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*79*		*37 - 130*	*06/05/19 11:29*	*06/08/19 04:49*	*1*

Client Sample ID: TO-ISS-BT-03 T07

Lab Sample ID: 180-89564-70
Matrix: Water
Date Collected: 06/17/19 05:15
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	60	J	100	49	ug/L			06/21/19 21:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*91*		*56 - 120*		*06/21/19 21:05*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	520		450	200	ug/L		06/20/19 13:55	06/24/19 22:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*75*		*37 - 130*	*06/20/19 13:55*	*06/24/19 22:34*	*1*

Client Sample ID: TO-ISS-BT-03 T08

Lab Sample ID: 180-89564-71
Matrix: Water
Date Collected: 06/24/19 05:15
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			06/26/19 21:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*84*		*56 - 120*		*06/26/19 21:46*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	230	J	450	200	ug/L		06/26/19 14:28	06/28/19 00:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*76*		*37 - 130*	*06/26/19 14:28*	*06/28/19 00:45*	*1*

Client Sample ID: TO-ISS-BT-03 T09

Lab Sample ID: 180-89564-72
Matrix: Water
Date Collected: 07/08/19 05:15
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			07/10/19 15:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*92*		*56 - 120*		*07/10/19 15:20*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	270	J	460	210	ug/L		07/15/19 14:52	07/17/19 08:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*91*		*37 - 130*	*07/15/19 14:52*	*07/17/19 08:45*	*1*

Client Sample ID: BLANK T01

Lab Sample ID: 180-89564-73
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/08/19 13:30	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/08/19 13:30	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/08/19 13:30	1
o-Xylene	ND		1.0	0.41	ug/L			05/08/19 13:30	1
Toluene	ND		1.0	0.46	ug/L			05/08/19 13:30	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/08/19 13:30	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/08/19 13:30	1
Trichloroethene	ND		1.0	0.69	ug/L			05/08/19 13:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*80*		*70 - 150*		*05/08/19 13:30*	*1*
4-Bromofluorobenzene (Surr)	*91*		*64 - 123*		*05/08/19 13:30*	*1*
Dibromofluoromethane (Surr)	*99*		*75 - 147*		*05/08/19 13:30*	*1*
Toluene-d8 (Surr)	*102*		*78 - 128*		*05/08/19 13:30*	*1*

Client Sample ID: BLANK T01

Lab Sample ID: 180-89564-73
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.7		0.1	0.1	SU			05/06/19 10:15	1
Specific Conductance	ND		1.0	1.0	umhos/cm			05/06/19 10:15	1
Oxidation Reduction Potential	600		10	10	millivolts			05/06/19 10:15	1

Client Sample ID: BLANK T02

Lab Sample ID: 180-89564-74
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/08/19 14:48	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/08/19 14:48	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/08/19 14:48	1
o-Xylene	ND		1.0	0.41	ug/L			05/08/19 14:48	1
Toluene	ND		1.0	0.46	ug/L			05/08/19 14:48	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/08/19 14:48	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/08/19 14:48	1
Trichloroethene	ND		1.0	0.69	ug/L			05/08/19 14:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*82*		*70 - 150*		*05/08/19 14:48*	*1*
4-Bromofluorobenzene (Surr)	*89*		*64 - 123*		*05/08/19 14:48*	*1*
Dibromofluoromethane (Surr)	*95*		*75 - 147*		*05/08/19 14:48*	*1*
Toluene-d8 (Surr)	*101*		*78 - 128*		*05/08/19 14:48*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.7		0.1	0.1	SU			05/07/19 08:15	1
Specific Conductance	ND		1.0	1.0	umhos/cm			05/07/19 08:15	1
Oxidation Reduction Potential	580		10	10	millivolts			05/07/19 08:15	1

Client Sample ID: BLANK T03

Lab Sample ID: 180-89564-75
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/09/19 09:39	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/09/19 09:39	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/09/19 09:39	1
o-Xylene	ND		1.0	0.41	ug/L			05/09/19 09:39	1
Toluene	ND		1.0	0.46	ug/L			05/09/19 09:39	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/09/19 09:39	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/09/19 09:39	1
Trichloroethene	ND		1.0	0.69	ug/L			05/09/19 09:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*70 - 150*		*05/09/19 09:39*	*1*
4-Bromofluorobenzene (Surr)	*88*		*64 - 123*		*05/09/19 09:39*	*1*
Dibromofluoromethane (Surr)	*111*		*75 - 147*		*05/09/19 09:39*	*1*
Toluene-d8 (Surr)	*101*		*78 - 128*		*05/09/19 09:39*	*1*

Client Sample ID: BLANK T03

Lab Sample ID: 180-89564-75
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.6		0.1	0.1	SU			05/08/19 08:15	1
Specific Conductance	ND		1.0	1.0	umhos/cm			05/08/19 08:15	1
Oxidation Reduction Potential	610		10	10	millivolts			05/08/19 08:15	1

Client Sample ID: BLANK T04

Lab Sample ID: 180-89564-76
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/13/19 11:49	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/13/19 11:49	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/13/19 11:49	1
o-Xylene	ND		1.0	0.41	ug/L			05/13/19 11:49	1
Toluene	ND		1.0	0.46	ug/L			05/13/19 11:49	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/13/19 11:49	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/13/19 11:49	1
Trichloroethene	ND		1.0	0.69	ug/L			05/13/19 11:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*70 - 150*		*05/13/19 11:49*	*1*
4-Bromofluorobenzene (Surr)	*85*		*64 - 123*		*05/13/19 11:49*	*1*
Dibromofluoromethane (Surr)	*115*		*75 - 147*		*05/13/19 11:49*	*1*
Toluene-d8 (Surr)	*107*		*78 - 128*		*05/13/19 11:49*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.9		0.1	0.1	SU			05/13/19 08:15	1
Specific Conductance	ND		1.0	1.0	umhos/cm			05/13/19 08:15	1
Oxidation Reduction Potential	600		10	10	millivolts			05/13/19 08:15	1

Client Sample ID: BLANK T05

Lab Sample ID: 180-89564-77
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/20/19 13:26	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/20/19 13:26	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/20/19 13:26	1
o-Xylene	ND		1.0	0.41	ug/L			05/20/19 13:26	1
Toluene	ND		1.0	0.46	ug/L			05/20/19 13:26	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/20/19 13:26	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/20/19 13:26	1
Trichloroethene	ND		1.0	0.69	ug/L			05/20/19 13:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*70 - 150*		*05/20/19 13:26*	*1*
4-Bromofluorobenzene (Surr)	*84*		*64 - 123*		*05/20/19 13:26*	*1*
Dibromofluoromethane (Surr)	*104*		*75 - 147*		*05/20/19 13:26*	*1*
Toluene-d8 (Surr)	*95*		*78 - 128*		*05/20/19 13:26*	*1*

Client Sample ID: BLANK T05

Lab Sample ID: 180-89564-77
Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**5.6**		0.1	0.1	SU			05/20/19 08:15	1
Specific Conductance	ND		1.0	1.0	umhos/cm			05/20/19 08:15	1
Oxidation Reduction Potential	**560**		10	10	millivolts			05/20/19 08:15	1

Client Sample ID: BLANK T06

Lab Sample ID: 180-89564-78
Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/03/19 13:02	1
Ethylbenzene	ND		1.0	0.51	ug/L			06/03/19 13:02	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			06/03/19 13:02	1
o-Xylene	ND		1.0	0.41	ug/L			06/03/19 13:02	1
Toluene	ND		1.0	0.46	ug/L			06/03/19 13:02	1
Xylenes, Total	ND		2.0	0.89	ug/L			06/03/19 13:02	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/03/19 13:02	1
Trichloroethene	ND		1.0	0.69	ug/L			06/03/19 13:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*70 - 150*		*06/03/19 13:02*	*1*
4-Bromofluorobenzene (Surr)	*94*		*64 - 123*		*06/03/19 13:02*	*1*
Dibromofluoromethane (Surr)	*108*		*75 - 147*		*06/03/19 13:02*	*1*
Toluene-d8 (Surr)	*89*		*78 - 128*		*06/03/19 13:02*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**5.7**		0.1	0.1	SU			06/03/19 08:15	1
Specific Conductance	ND		1.0	1.0	umhos/cm			06/03/19 08:15	1
Oxidation Reduction Potential	**590**		10	10	millivolts			06/03/19 08:15	1

Client Sample ID: BLANK T07

Lab Sample ID: 180-89564-79
Date Collected: 04/26/19 00:00
Matrix: Solid
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/17/19 16:43	1
Ethylbenzene	ND		1.0	0.51	ug/L			06/17/19 16:43	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			06/17/19 16:43	1
o-Xylene	ND		1.0	0.41	ug/L			06/17/19 16:43	1
Toluene	ND		1.0	0.46	ug/L			06/17/19 16:43	1
Xylenes, Total	ND		2.0	0.89	ug/L			06/17/19 16:43	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/17/19 16:43	1
Trichloroethene	ND		1.0	0.69	ug/L			06/17/19 16:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*70 - 150*		*06/17/19 16:43*	*1*
4-Bromofluorobenzene (Surr)	*100*		*64 - 123*		*06/17/19 16:43*	*1*
Dibromofluoromethane (Surr)	*125*		*75 - 147*		*06/17/19 16:43*	*1*
Toluene-d8 (Surr)	*99*		*78 - 128*		*06/17/19 16:43*	*1*

Client Sample ID: BLANK T07

Lab Sample ID: 180-89564-79
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.9		0.1	0.1	SU			06/17/19 08:15	1
Specific Conductance	ND		1.0	1.0	umhos/cm			06/17/19 08:15	1
Oxidation Reduction Potential	600		10	10	millivolts			06/17/19 08:15	1

Client Sample ID: BLANK T08

Lab Sample ID: 180-89564-80
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/24/19 15:08	1
Ethylbenzene	ND		1.0	0.51	ug/L			06/24/19 15:08	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			06/24/19 15:08	1
o-Xylene	ND		1.0	0.41	ug/L			06/24/19 15:08	1
Toluene	ND		1.0	0.46	ug/L			06/24/19 15:08	1
Xylenes, Total	ND		2.0	0.89	ug/L			06/24/19 15:08	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/24/19 15:08	1
Trichloroethene	ND		1.0	0.69	ug/L			06/24/19 15:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*80*		*70 - 150*		*06/24/19 15:08*	*1*
4-Bromofluorobenzene (Surr)	*72*		*64 - 123*		*06/24/19 15:08*	*1*
Dibromofluoromethane (Surr)	*94*		*75 - 147*		*06/24/19 15:08*	*1*
Toluene-d8 (Surr)	*93*		*78 - 128*		*06/24/19 15:08*	*1*

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.9		0.1	0.1	SU			06/24/19 08:15	1
Specific Conductance	ND		1.0	1.0	umhos/cm			06/24/19 08:15	1
Oxidation Reduction Potential	530		10	10	millivolts			06/24/19 08:15	1

Client Sample ID: BLANK T09

Lab Sample ID: 180-89564-81
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			07/10/19 15:23	1
Ethylbenzene	ND		1.0	0.51	ug/L			07/10/19 15:23	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			07/10/19 15:23	1
o-Xylene	ND		1.0	0.41	ug/L			07/10/19 15:23	1
Toluene	ND		1.0	0.46	ug/L			07/10/19 15:23	1
Xylenes, Total	ND		2.0	0.89	ug/L			07/10/19 15:23	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			07/10/19 15:23	1
Trichloroethene	ND		1.0	0.69	ug/L			07/10/19 15:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*78*		*70 - 150*		*07/10/19 15:23*	*1*
4-Bromofluorobenzene (Surr)	*97*		*64 - 123*		*07/10/19 15:23*	*1*
Dibromofluoromethane (Surr)	*96*		*75 - 147*		*07/10/19 15:23*	*1*
Toluene-d8 (Surr)	*107*		*78 - 128*		*07/10/19 15:23*	*1*

Client Sample ID: BLANK T09

Lab Sample ID: 180-89564-81
Matrix: Solid
Date Collected: 04/26/19 00:00
Date Received: 04/30/19 15:40

General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.8		0.1	0.1	SU			07/08/19 08:20	1
Specific Conductance	2.4		1.0	1.0	umhos/cm			07/08/19 08:20	1
Oxidation Reduction Potential	330		10	10	millivolts			07/08/19 08:20	1

Client Sample ID: BLANK T01

Lab Sample ID: 180-89564-82
Matrix: Water
Date Collected: 05/06/19 05:15
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/11/19 01:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*101*		*56 - 120*		*05/11/19 01:36*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/09/19 10:18	05/10/19 22:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*84*		*37 - 130*	*05/09/19 10:18*	*05/10/19 22:37*	*1*

Client Sample ID: BLANK T02

Lab Sample ID: 180-89564-83
Matrix: Water
Date Collected: 05/07/19 05:15
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/11/19 06:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*96*		*56 - 120*		*05/11/19 06:32*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/09/19 10:18	05/10/19 23:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*80*		*37 - 130*	*05/09/19 10:18*	*05/10/19 23:04*	*1*

Client Sample ID: BLANK T03

Lab Sample ID: 180-89564-84
Matrix: Water
Date Collected: 05/08/19 05:15
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/11/19 07:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*95*		*56 - 120*		*05/11/19 07:09*	*1*

Client Sample ID: BLANK T03

Date Collected: 05/08/19 05:15
Date Received: 04/30/19 15:40

Lab Sample ID: 180-89564-84
Matrix: Water

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/10/19 11:51	05/13/19 20:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*77*		*37 - 130*	*05/10/19 11:51*	*05/13/19 20:45*	*1*

Client Sample ID: BLANK T04

Date Collected: 05/13/19 05:15
Date Received: 04/30/19 15:40

Lab Sample ID: 180-89564-85
Matrix: Water

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/15/19 17:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*91*		*56 - 120*		*05/15/19 17:26*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/15/19 10:38	05/16/19 22:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*81*		*37 - 130*	*05/15/19 10:38*	*05/16/19 22:24*	*1*

Client Sample ID: BLANK T05

Date Collected: 05/20/19 05:15
Date Received: 04/30/19 15:40

Lab Sample ID: 180-89564-86
Matrix: Water

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/23/19 00:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*94*		*56 - 120*		*05/23/19 00:29*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		05/22/19 08:46	05/24/19 04:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*88*		*37 - 130*	*05/22/19 08:46*	*05/24/19 04:42*	*1*

Client Sample ID: BLANK T06

Date Collected: 06/03/19 05:15
Date Received: 04/30/19 15:40

Lab Sample ID: 180-89564-87
Matrix: Water

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			06/06/19 17:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*86*		*56 - 120*		*06/06/19 17:10*	*1*

Client Sample ID: BLANK T06

Lab Sample ID: 180-89564-87
Matrix: Water
Date Collected: 06/03/19 05:15
Date Received: 04/30/19 15:40

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	220	J	450	200	ug/L		06/05/19 11:29	06/08/19 05:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*82*		*37 - 130*	*06/05/19 11:29*	*06/08/19 05:16*	*1*

Client Sample ID: BLANK T07

Lab Sample ID: 180-89564-88
Matrix: Water
Date Collected: 06/17/19 05:15
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			06/21/19 21:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*90*		*56 - 120*		*06/21/19 21:44*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	270	J	450	200	ug/L		06/20/19 13:55	06/24/19 23:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*80*		*37 - 130*	*06/20/19 13:55*	*06/24/19 23:01*	*1*

Client Sample ID: BLANK T08

Lab Sample ID: 180-89564-89
Matrix: Water
Date Collected: 06/24/19 05:15
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			06/26/19 22:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*92*		*56 - 120*		*06/26/19 22:29*	*1*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		450	200	ug/L		06/26/19 14:28	06/28/19 01:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*81*		*37 - 130*	*06/26/19 14:28*	*06/28/19 01:12*	*1*

Client Sample ID: BLANK T09

Lab Sample ID: 180-89564-90
Matrix: Water
Date Collected: 07/08/19 05:15
Date Received: 04/30/19 15:40

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			07/10/19 16:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*95*		*56 - 120*		*07/10/19 16:11*	*1*

Client: Geosyntec Consultants, Inc.
Project/Site: Time Oil CHE8384

Job ID: 180-89564-1

Client Sample ID: BLANK T09
Date Collected: 07/08/19 05:15
Date Received: 04/30/19 15:40

Lab Sample ID: 180-89564-90
Matrix: Water

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	250	J	450	200	ug/L		07/15/19 14:52	07/17/19 09:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*96*		*37 - 130*	*07/15/19 14:52*	*07/17/19 09:13*	*1*

Method: EPA 8260C - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 180-278065/8
Matrix: Solid
Analysis Batch: 278065

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/08/19 10:01	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/08/19 10:01	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/08/19 10:01	1
o-Xylene	ND		1.0	0.41	ug/L			05/08/19 10:01	1
Toluene	ND		1.0	0.46	ug/L			05/08/19 10:01	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/08/19 10:01	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/08/19 10:01	1
Trichloroethene	ND		1.0	0.69	ug/L			05/08/19 10:01	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*70 - 150*		*05/08/19 10:01*	*1*
4-Bromofluorobenzene (Surr)	*82*		*64 - 123*		*05/08/19 10:01*	*1*
Dibromofluoromethane (Surr)	*113*		*75 - 147*		*05/08/19 10:01*	*1*
Toluene-d8 (Surr)	*90*		*78 - 128*		*05/08/19 10:01*	*1*

Lab Sample ID: LCS 180-278065/20
Matrix: Solid
Analysis Batch: 278065

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	10.4		ug/L		104	79 - 121
Ethylbenzene	10.0	9.86		ug/L		99	71 - 120
m-Xylene & p-Xylene	10.0	9.96		ug/L		100	72 - 119
o-Xylene	10.0	9.89		ug/L		99	64 - 121
Toluene	10.0	10.1		ug/L		101	76 - 136
Xylenes, Total	20.0	19.9		ug/L		99	69 - 119
cis-1,2-Dichloroethene	10.0	10.5		ug/L		105	76 - 117
Trichloroethene	10.0	10.7		ug/L		107	71 - 121

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*106*		*70 - 150*
4-Bromofluorobenzene (Surr)	*103*		*64 - 123*
Dibromofluoromethane (Surr)	*117*		*75 - 147*
Toluene-d8 (Surr)	*109*		*78 - 128*

Lab Sample ID: MB 180-278179/5
Matrix: Solid
Analysis Batch: 278179

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/09/19 08:49	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/09/19 08:49	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/09/19 08:49	1
o-Xylene	ND		1.0	0.41	ug/L			05/09/19 08:49	1
Toluene	ND		1.0	0.46	ug/L			05/09/19 08:49	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/09/19 08:49	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/09/19 08:49	1
Trichloroethene	ND		1.0	0.69	ug/L			05/09/19 08:49	1

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	94		70 - 150		05/09/19 08:49	1
4-Bromofluorobenzene (Surr)	87		64 - 123		05/09/19 08:49	1
Dibromofluoromethane (Surr)	106		75 - 147		05/09/19 08:49	1
Toluene-d8 (Surr)	94		78 - 128		05/09/19 08:49	1

Lab Sample ID: LCS 180-278179/3
Matrix: Solid
Analysis Batch: 278179

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	9.27		ug/L		93	79 - 121
Ethylbenzene	10.0	9.10		ug/L		91	71 - 120
m-Xylene & p-Xylene	10.0	9.29		ug/L		93	72 - 119
o-Xylene	10.0	9.38		ug/L		94	64 - 121
Toluene	10.0	9.19		ug/L		92	76 - 136
Xylenes, Total	20.0	18.7		ug/L		93	69 - 119
cis-1,2-Dichloroethene	10.0	9.77		ug/L		98	76 - 117
Trichloroethene	10.0	10.1		ug/L		101	71 - 121

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	103		70 - 150
4-Bromofluorobenzene (Surr)	93		64 - 123
Dibromofluoromethane (Surr)	109		75 - 147
Toluene-d8 (Surr)	97		78 - 128

Lab Sample ID: MB 180-278479/7
Matrix: Solid
Analysis Batch: 278479

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/13/19 09:58	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/13/19 09:58	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/13/19 09:58	1
o-Xylene	ND		1.0	0.41	ug/L			05/13/19 09:58	1
Toluene	ND		1.0	0.46	ug/L			05/13/19 09:58	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/13/19 09:58	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/13/19 09:58	1
Trichloroethene	ND		1.0	0.69	ug/L			05/13/19 09:58	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	116		70 - 150		05/13/19 09:58	1
4-Bromofluorobenzene (Surr)	91		64 - 123		05/13/19 09:58	1
Dibromofluoromethane (Surr)	119		75 - 147		05/13/19 09:58	1
Toluene-d8 (Surr)	95		78 - 128		05/13/19 09:58	1

Lab Sample ID: LCS 180-278479/17
Matrix: Solid
Analysis Batch: 278479

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	9.97		ug/L		100	79 - 121

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 180-278479/17
Matrix: Solid
Analysis Batch: 278479

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ethylbenzene	10.0	8.47		ug/L		85	71 - 120
m-Xylene & p-Xylene	10.0	8.72		ug/L		87	72 - 119
o-Xylene	10.0	8.47		ug/L		85	64 - 121
Toluene	10.0	8.37		ug/L		84	76 - 136
Xylenes, Total	20.0	17.2		ug/L		86	69 - 119
cis-1,2-Dichloroethene	10.0	10.8		ug/L		108	76 - 117
Trichloroethene	10.0	11.7		ug/L		117	71 - 121

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*104*		*70 - 150*
4-Bromofluorobenzene (Surr)	*79*		*64 - 123*
Dibromofluoromethane (Surr)	*116*		*75 - 147*
Toluene-d8 (Surr)	*88*		*78 - 128*

Lab Sample ID: MB 180-279149/6
Matrix: Solid
Analysis Batch: 279149

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			05/20/19 10:06	1
Ethylbenzene	ND		1.0	0.51	ug/L			05/20/19 10:06	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			05/20/19 10:06	1
o-Xylene	ND		1.0	0.41	ug/L			05/20/19 10:06	1
Toluene	ND		1.0	0.46	ug/L			05/20/19 10:06	1
Xylenes, Total	ND		2.0	0.89	ug/L			05/20/19 10:06	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			05/20/19 10:06	1
Trichloroethene	ND		1.0	0.69	ug/L			05/20/19 10:06	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*70 - 150*		*05/20/19 10:06*	*1*
4-Bromofluorobenzene (Surr)	*94*		*64 - 123*		*05/20/19 10:06*	*1*
Dibromofluoromethane (Surr)	*107*		*75 - 147*		*05/20/19 10:06*	*1*
Toluene-d8 (Surr)	*94*		*78 - 128*		*05/20/19 10:06*	*1*

Lab Sample ID: LCS 180-279149/4
Matrix: Solid
Analysis Batch: 279149

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	9.37		ug/L		94	79 - 121
Ethylbenzene	10.0	9.94		ug/L		99	71 - 120
m-Xylene & p-Xylene	10.0	10.2		ug/L		102	72 - 119
o-Xylene	10.0	9.55		ug/L		95	64 - 121
Toluene	10.0	9.62		ug/L		96	76 - 136
Xylenes, Total	20.0	19.7		ug/L		99	69 - 119
cis-1,2-Dichloroethene	10.0	10.4		ug/L		104	76 - 117
Trichloroethene	10.0	11.4		ug/L		114	71 - 121

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 180-279149/4
Matrix: Solid
Analysis Batch: 279149

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	98		70 - 150
4-Bromofluorobenzene (Surr)	114		64 - 123
Dibromofluoromethane (Surr)	116		75 - 147
Toluene-d8 (Surr)	104		78 - 128

Lab Sample ID: MB 180-280453/8
Matrix: Solid
Analysis Batch: 280453

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/03/19 10:43	1
Ethylbenzene	ND		1.0	0.51	ug/L			06/03/19 10:43	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			06/03/19 10:43	1
o-Xylene	ND		1.0	0.41	ug/L			06/03/19 10:43	1
Toluene	ND		1.0	0.46	ug/L			06/03/19 10:43	1
Xylenes, Total	ND		2.0	0.89	ug/L			06/03/19 10:43	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/03/19 10:43	1
Trichloroethene	ND		1.0	0.69	ug/L			06/03/19 10:43	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	127		70 - 150		06/03/19 10:43	1
4-Bromofluorobenzene (Surr)	102		64 - 123		06/03/19 10:43	1
Dibromofluoromethane (Surr)	124		75 - 147		06/03/19 10:43	1
Toluene-d8 (Surr)	91		78 - 128		06/03/19 10:43	1

Lab Sample ID: LCS 180-280453/15
Matrix: Solid
Analysis Batch: 280453

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	7.99		ug/L		80	79 - 121
Ethylbenzene	10.0	8.13		ug/L		81	71 - 120
m-Xylene & p-Xylene	10.0	8.27		ug/L		83	72 - 119
o-Xylene	10.0	8.92		ug/L		89	64 - 121
Toluene	10.0	8.11		ug/L		81	76 - 136
Xylenes, Total	20.0	17.2		ug/L		86	69 - 119
cis-1,2-Dichloroethene	10.0	9.12		ug/L		91	76 - 117
Trichloroethene	10.0	10.1		ug/L		101	71 - 121

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	122		70 - 150
4-Bromofluorobenzene (Surr)	101		64 - 123
Dibromofluoromethane (Surr)	116		75 - 147
Toluene-d8 (Surr)	85		78 - 128

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 180-281902/7
Matrix: Solid
Analysis Batch: 281902

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/17/19 09:13	1
Ethylbenzene	ND		1.0	0.51	ug/L			06/17/19 09:13	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			06/17/19 09:13	1
o-Xylene	ND		1.0	0.41	ug/L			06/17/19 09:13	1
Toluene	ND		1.0	0.46	ug/L			06/17/19 09:13	1
Xylenes, Total	ND		2.0	0.89	ug/L			06/17/19 09:13	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/17/19 09:13	1
Trichloroethene	ND		1.0	0.69	ug/L			06/17/19 09:13	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*70 - 150*		*06/17/19 09:13*	*1*
4-Bromofluorobenzene (Surr)	*82*		*64 - 123*		*06/17/19 09:13*	*1*
Dibromofluoromethane (Surr)	*103*		*75 - 147*		*06/17/19 09:13*	*1*
Toluene-d8 (Surr)	*86*		*78 - 128*		*06/17/19 09:13*	*1*

Lab Sample ID: LCS 180-281902/5
Matrix: Solid
Analysis Batch: 281902

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	8.68		ug/L		87	79 - 121
Ethylbenzene	10.0	9.92		ug/L		99	71 - 120
m-Xylene & p-Xylene	10.0	9.84		ug/L		98	72 - 119
o-Xylene	10.0	9.67		ug/L		97	64 - 121
Toluene	10.0	9.07		ug/L		91	76 - 136
Xylenes, Total	20.0	19.5		ug/L		98	69 - 119
cis-1,2-Dichloroethene	10.0	9.63		ug/L		96	76 - 117
Trichloroethene	10.0	10.9		ug/L		109	71 - 121

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*70 - 150*
4-Bromofluorobenzene (Surr)	*94*		*64 - 123*
Dibromofluoromethane (Surr)	*99*		*75 - 147*
Toluene-d8 (Surr)	*88*		*78 - 128*

Lab Sample ID: MB 180-282660/7
Matrix: Solid
Analysis Batch: 282660

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			06/24/19 09:29	1
Ethylbenzene	ND		1.0	0.51	ug/L			06/24/19 09:29	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			06/24/19 09:29	1
o-Xylene	ND		1.0	0.41	ug/L			06/24/19 09:29	1
Toluene	ND		1.0	0.46	ug/L			06/24/19 09:29	1
Xylenes, Total	ND		2.0	0.89	ug/L			06/24/19 09:29	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			06/24/19 09:29	1
Trichloroethene	ND		1.0	0.69	ug/L			06/24/19 09:29	1

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	77		70 - 150		06/24/19 09:29	1
4-Bromofluorobenzene (Surr)	77		64 - 123		06/24/19 09:29	1
Dibromofluoromethane (Surr)	99		75 - 147		06/24/19 09:29	1
Toluene-d8 (Surr)	91		78 - 128		06/24/19 09:29	1

Lab Sample ID: LCS 180-282660/4
Matrix: Solid
Analysis Batch: 282660

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	9.41		ug/L		94	79 - 121
Ethylbenzene	10.0	9.36		ug/L		94	71 - 120
m-Xylene & p-Xylene	10.0	9.05		ug/L		91	72 - 119
o-Xylene	10.0	9.56		ug/L		96	64 - 121
Toluene	10.0	9.79		ug/L		98	76 - 136
Xylenes, Total	20.0	18.6		ug/L		93	69 - 119
cis-1,2-Dichloroethene	10.0	9.82		ug/L		98	76 - 117
Trichloroethene	10.0	9.24		ug/L		92	71 - 121

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	76		70 - 150
4-Bromofluorobenzene (Surr)	87		64 - 123
Dibromofluoromethane (Surr)	94		75 - 147
Toluene-d8 (Surr)	96		78 - 128

Lab Sample ID: MB 180-284331/16
Matrix: Solid
Analysis Batch: 284331

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.60	ug/L			07/10/19 13:17	1
Ethylbenzene	ND		1.0	0.51	ug/L			07/10/19 13:17	1
m-Xylene & p-Xylene	ND		1.0	0.48	ug/L			07/10/19 13:17	1
o-Xylene	ND		1.0	0.41	ug/L			07/10/19 13:17	1
Toluene	ND		1.0	0.46	ug/L			07/10/19 13:17	1
Xylenes, Total	ND		2.0	0.89	ug/L			07/10/19 13:17	1
cis-1,2-Dichloroethene	ND		1.0	0.71	ug/L			07/10/19 13:17	1
Trichloroethene	ND		1.0	0.69	ug/L			07/10/19 13:17	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	76		70 - 150		07/10/19 13:17	1
4-Bromofluorobenzene (Surr)	92		64 - 123		07/10/19 13:17	1
Dibromofluoromethane (Surr)	92		75 - 147		07/10/19 13:17	1
Toluene-d8 (Surr)	108		78 - 128		07/10/19 13:17	1

Lab Sample ID: LCS 180-284331/24
Matrix: Solid
Analysis Batch: 284331

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	10.5		ug/L		105	79 - 121

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 180-284331/24
Matrix: Solid
Analysis Batch: 284331

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ethylbenzene	10.0	9.92		ug/L		99	71 - 120
m-Xylene & p-Xylene	10.0	9.75		ug/L		98	72 - 119
o-Xylene	10.0	10.2		ug/L		102	64 - 121
Toluene	10.0	9.74		ug/L		97	76 - 136
Xylenes, Total	20.0	19.9		ug/L		100	69 - 119
cis-1,2-Dichloroethene	10.0	11.0		ug/L		110	76 - 117
Trichloroethene	10.0	9.29		ug/L		93	71 - 121

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*84*		*70 - 150*
4-Bromofluorobenzene (Surr)	*112*		*64 - 123*
Dibromofluoromethane (Surr)	*104*		*75 - 147*
Toluene-d8 (Surr)	*113*		*78 - 128*

Lab Sample ID: 180-89564-6 MS
Matrix: Solid
Analysis Batch: 280453

Client Sample ID: TO-ISS-AK-01 T06
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	ND		10.0	8.21		ug/L		82	79 - 121
Ethylbenzene	ND		10.0	8.28		ug/L		83	71 - 120
m-Xylene & p-Xylene	ND		10.0	8.66		ug/L		87	72 - 119
o-Xylene	ND		10.0	8.89		ug/L		89	64 - 121
Toluene	ND	F1	10.0	8.10		ug/L		81	76 - 136
Xylenes, Total	ND		20.0	17.5		ug/L		88	69 - 119
cis-1,2-Dichloroethene	ND		10.0	9.39		ug/L		94	76 - 117
Trichloroethene	28		10.0	38.1		ug/L		101	71 - 121

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*101*		*70 - 150*
4-Bromofluorobenzene (Surr)	*94*		*64 - 123*
Dibromofluoromethane (Surr)	*100*		*75 - 147*
Toluene-d8 (Surr)	*78*		*78 - 128*

Lab Sample ID: 180-89564-6 MSD
Matrix: Solid
Analysis Batch: 280453

Client Sample ID: TO-ISS-AK-01 T06
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	ND		10.0	7.87		ug/L		79	79 - 121	4	27
Ethylbenzene	ND		10.0	8.25		ug/L		82	71 - 120	0	27
m-Xylene & p-Xylene	ND		10.0	8.05		ug/L		80	72 - 119	7	27
o-Xylene	ND		10.0	8.37		ug/L		84	64 - 121	6	27
Toluene	ND	F1	10.0	7.17	F1	ug/L		72	76 - 136	12	31
Xylenes, Total	ND		20.0	16.4		ug/L		82	69 - 119	7	27
cis-1,2-Dichloroethene	ND		10.0	8.87		ug/L		89	76 - 117	6	28
Trichloroethene	28		10.0	36.9		ug/L		89	71 - 121	3	28

Method: EPA 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 180-89564-6 MSD
Matrix: Solid
Analysis Batch: 280453

Client Sample ID: TO-ISS-AK-01 T06
Prep Type: Leach

Surrogate	MSD %Recovery	MSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	*114*		*70 - 150*
4-Bromofluorobenzene (Surr)	*87*		*64 - 123*
Dibromofluoromethane (Surr)	*107*		*75 - 147*
Toluene-d8 (Surr)	*78*		*78 - 128*

Lab Sample ID: 180-89564-27 MS
Matrix: Solid
Analysis Batch: 284331

Client Sample ID: TO-ISS-BT-01 T09
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	ND		10.0	10.6		ug/L		106	79 - 121
Ethylbenzene	0.83	J	10.0	10.9		ug/L		100	71 - 120
m-Xylene & p-Xylene	2.1		10.0	10.7		ug/L		86	72 - 119
o-Xylene	4.5	F1	10.0	11.0		ug/L		65	64 - 121
Toluene	ND		10.0	10.6		ug/L		106	76 - 136
Xylenes, Total	6.6	F1	20.0	21.6		ug/L		75	69 - 119
cis-1,2-Dichloroethene	ND		10.0	11.1		ug/L		111	76 - 117
Trichloroethene	ND		10.0	9.75		ug/L		97	71 - 121

Surrogate	MS %Recovery	MS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	*71*		*70 - 150*
4-Bromofluorobenzene (Surr)	*100*		*64 - 123*
Dibromofluoromethane (Surr)	*92*		*75 - 147*
Toluene-d8 (Surr)	*103*		*78 - 128*

Lab Sample ID: 180-89564-27 MSD
Matrix: Solid
Analysis Batch: 284331

Client Sample ID: TO-ISS-BT-01 T09
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	ND		10.0	10.2		ug/L		102	79 - 121	4	27
Ethylbenzene	0.83	J	10.0	10.0		ug/L		92	71 - 120	8	27
m-Xylene & p-Xylene	2.1		10.0	9.48		ug/L		74	72 - 119	12	27
o-Xylene	4.5	F1	10.0	10.5	F1	ug/L		60	64 - 121	4	27
Toluene	ND		10.0	9.84		ug/L		98	76 - 136	7	31
Xylenes, Total	6.6	F1	20.0	20.0	F1	ug/L		67	69 - 119	8	27
cis-1,2-Dichloroethene	ND		10.0	10.8		ug/L		108	76 - 117	3	28
Trichloroethene	ND		10.0	9.33		ug/L		93	71 - 121	4	28

Surrogate	MSD %Recovery	MSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	*73*		*70 - 150*
4-Bromofluorobenzene (Surr)	*97*		*64 - 123*
Dibromofluoromethane (Surr)	*89*		*75 - 147*
Toluene-d8 (Surr)	*96*		*78 - 128*

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Lab Sample ID: MB 240-380447/3
Matrix: Water
Analysis Batch: 380447

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/10/19 11:01	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*101*		*56 - 120*		*05/10/19 11:01*	*1*

Lab Sample ID: LCS 240-380447/4
Matrix: Water
Analysis Batch: 380447

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Gasoline Range Organics [C6 - C10]	800	953		ug/L		119	73 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Trifluorotoluene (Surr)	*97*		*56 - 120*

Lab Sample ID: MB 240-380660/3
Matrix: Water
Analysis Batch: 380660

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/10/19 23:20	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*92*		*56 - 120*		*05/10/19 23:20*	*1*

Lab Sample ID: LCS 240-380660/4
Matrix: Water
Analysis Batch: 380660

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Gasoline Range Organics [C6 - C10]	800	822		ug/L		103	73 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Trifluorotoluene (Surr)	*100*		*56 - 120*

Lab Sample ID: 180-89564-47 MS
Matrix: Water
Analysis Batch: 380660

Client Sample ID: TO-ISS-AK-03 T02
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Gasoline Range Organics [C6 - C10]	ND		800	770		ug/L		96	61 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Trifluorotoluene (Surr)	*96*		*56 - 120*

Method: 8015D - Gasoline Range Organics (GRO) (GC) (Continued)

Lab Sample ID: 180-89564-47 MSD
Matrix: Water
Analysis Batch: 380660

Client Sample ID: TO-ISS-AK-03 T02
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Gasoline Range Organics [C6 - C10]	ND		800	771		ug/L		96	61 - 120	0	23

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Trifluorotoluene (Surr)	*100*		*56 - 120*

Lab Sample ID: MB 240-381358/4
Matrix: Water
Analysis Batch: 381358

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/15/19 11:09	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*91*		*56 - 120*		*05/15/19 11:09*	*1*

Lab Sample ID: LCS 240-381358/5
Matrix: Water
Analysis Batch: 381358

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Gasoline Range Organics [C6 - C10]			800	884		ug/L		111	73 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Trifluorotoluene (Surr)	*99*		*56 - 120*

Lab Sample ID: 180-89564-40 MS
Matrix: Water
Analysis Batch: 381358

Client Sample ID: TO-ISS-AK-01 T04
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Gasoline Range Organics [C6 - C10]	ND		800	873		ug/L		109	61 - 120		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Trifluorotoluene (Surr)	*101*		*56 - 120*

Lab Sample ID: 180-89564-40 MSD
Matrix: Water
Analysis Batch: 381358

Client Sample ID: TO-ISS-AK-01 T04
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Gasoline Range Organics [C6 - C10]	ND		800	825		ug/L		103	61 - 120	6	23

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Trifluorotoluene (Surr)	*98*		*56 - 120*

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Lab Sample ID: MB 240-382529/4
Matrix: Water
Analysis Batch: 382529

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			05/22/19 11:56	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*94*		*56 - 120*		*05/22/19 11:56*	*1*

Lab Sample ID: LCS 240-382529/5
Matrix: Water
Analysis Batch: 382529

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Gasoline Range Organics [C6 - C10]			800	923		ug/L		115	73 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Trifluorotoluene (Surr)	*98*		*56 - 120*

Lab Sample ID: MB 240-384863/4
Matrix: Water
Analysis Batch: 384863

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			06/06/19 13:19	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*84*		*56 - 120*		*06/06/19 13:19*	*1*

Lab Sample ID: LCS 240-384863/5
Matrix: Water
Analysis Batch: 384863

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Gasoline Range Organics [C6 - C10]			800	830		ug/L		104	73 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Trifluorotoluene (Surr)	*96*		*56 - 120*

Lab Sample ID: MB 240-387560/6
Matrix: Water
Analysis Batch: 387560

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			06/21/19 16:29	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*90*		*56 - 120*		*06/21/19 16:29*	*1*

Method: 8015D - Gasoline Range Organics (GRO) (GC) (Continued)

Lab Sample ID: LCS 240-387560/7
Matrix: Water
Analysis Batch: 387560

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Gasoline Range Organics [C6 - C10]			800	830		ug/L		104	73 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Trifluorotoluene (Surr)	*96*		*56 - 120*

Lab Sample ID: 180-89564-43 MS
Matrix: Water
Analysis Batch: 387560

Client Sample ID: TO-ISS-AK-01 T07
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Gasoline Range Organics [C6 - C10]	55	J	800	851		ug/L		99	61 - 120		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Trifluorotoluene (Surr)	*100*		*56 - 120*

Lab Sample ID: 180-89564-43 MSD
Matrix: Water
Analysis Batch: 387560

Client Sample ID: TO-ISS-AK-01 T07
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Gasoline Range Organics [C6 - C10]	55	J	800	819		ug/L		96	61 - 120	4	23

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Trifluorotoluene (Surr)	*101*		*56 - 120*

Lab Sample ID: MB 240-388323/3
Matrix: Water
Analysis Batch: 388323

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			06/26/19 12:11	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*90*		*56 - 120*		*06/26/19 12:11*	*1*

Lab Sample ID: LCS 240-388323/4
Matrix: Water
Analysis Batch: 388323

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Gasoline Range Organics [C6 - C10]			800	831		ug/L		104	73 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Trifluorotoluene (Surr)	*95*		*56 - 120*

Method: 8015D - Gasoline Range Organics (GRO) (GC)

Lab Sample ID: MB 240-390440/4
Matrix: Water
Analysis Batch: 390440

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		100	49	ug/L			07/10/19 10:03	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Trifluorotoluene (Surr)	*90*		*56 - 120*		*07/10/19 10:03*	*1*

Lab Sample ID: LCS 240-390440/5
Matrix: Water
Analysis Batch: 390440

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Gasoline Range Organics [C6 - C10]	800	919		ug/L		115	73 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Trifluorotoluene (Surr)	*93*		*56 - 120*

Lab Sample ID: 180-89564-45 MS
Matrix: Water
Analysis Batch: 390440

Client Sample ID: TO-ISS-AK-01 T09
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Gasoline Range Organics [C6 - C10]	ND		800	825		ug/L		103	61 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Trifluorotoluene (Surr)	*95*		*56 - 120*

Lab Sample ID: 180-89564-45 MSD
Matrix: Water
Analysis Batch: 390440

Client Sample ID: TO-ISS-AK-01 T09
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Gasoline Range Organics [C6 - C10]	ND		800	842		ug/L		105	61 - 120	2	23

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Trifluorotoluene (Surr)	*93*		*56 - 120*

Method: 8015D - Diesel Range Organics (DRO) (GC)

Lab Sample ID: MB 240-380404/21-A
Matrix: Water
Analysis Batch: 380665

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380404

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		500	230	ug/L		05/09/19 10:18	05/10/19 17:39	1

Method: 8015D - Diesel Range Organics (DRO) (GC) (Continued)

Lab Sample ID: MB 240-380404/21-A
Matrix: Water
Analysis Batch: 380665

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380404

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	83		37 - 130	05/09/19 10:18	05/10/19 17:39	1

Lab Sample ID: LCS 240-380404/22-A
Matrix: Water
Analysis Batch: 380665

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380404

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Diesel Range Organics [C10 - C28]			2000	1440		ug/L		72	56 - 120		

Surrogate	LCS %Recovery	LCS Qualifier	Limits
o-Terphenyl	89		37 - 130

Lab Sample ID: MB 240-380685/11-A
Matrix: Water
Analysis Batch: 380971

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380685

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		500	230	ug/L		05/10/19 11:51	05/13/19 15:45	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	78		37 - 130	05/10/19 11:51	05/13/19 15:45	1

Lab Sample ID: LCS 240-380685/12-A
Matrix: Water
Analysis Batch: 380971

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380685

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Diesel Range Organics [C10 - C28]			2000	1480		ug/L		74	56 - 120		

Surrogate	LCS %Recovery	LCS Qualifier	Limits
o-Terphenyl	86		37 - 130

Lab Sample ID: MB 240-381431/15-A
Matrix: Water
Analysis Batch: 381700

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 381431

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		500	230	ug/L		05/15/19 10:38	05/16/19 16:55	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	83		37 - 130	05/15/19 10:38	05/16/19 16:55	1

Method: 8015D - Diesel Range Organics (DRO) (GC) (Continued)

Lab Sample ID: LCS 240-381431/16-A
Matrix: Water
Analysis Batch: 381700

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 381431

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics [C10 - C28]	2000	1590		ug/L		80	56 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl	*82*		*37 - 130*

Lab Sample ID: MB 240-382856/11-A
Matrix: Water
Analysis Batch: 382883

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 382856

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		500	230	ug/L		05/22/19 08:46	05/23/19 23:15	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*93*		*37 - 130*	*05/22/19 08:46*	*05/23/19 23:15*	*1*

Lab Sample ID: LCS 240-382856/12-A
Matrix: Water
Analysis Batch: 382883

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 382856

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics [C10 - C28]	2000	1630		ug/L		82	56 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl	*89*		*37 - 130*

Lab Sample ID: MB 240-384644/15-A
Matrix: Water
Analysis Batch: 385091

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 384644

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		500	230	ug/L		06/05/19 11:29	06/07/19 22:01	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*78*		*37 - 130*	*06/05/19 11:29*	*06/07/19 22:01*	*1*

Lab Sample ID: LCS 240-384644/16-A
Matrix: Water
Analysis Batch: 385091

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 384644

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics [C10 - C28]	2000	1710		ug/L		86	56 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl	*89*		*37 - 130*

Method: 8015D - Diesel Range Organics (DRO) (GC) (Continued)

Lab Sample ID: MB 240-388426/12-A
Matrix: Water
Analysis Batch: 388696

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 388426

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		500	230	ug/L		06/26/19 14:28	06/27/19 21:05	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*83*		*37 - 130*	*06/26/19 14:28*	*06/27/19 21:05*	*1*

Lab Sample ID: LCS 240-388426/13-A
Matrix: Water
Analysis Batch: 388696

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 388426

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics [C10 - C28]	2000	1460		ug/L		73	56 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl	*82*		*37 - 130*

Lab Sample ID: MB 240-391263/19-A
Matrix: Water
Analysis Batch: 391441

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 391263

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C34	ND		500	230	ug/L		07/15/19 14:52	07/16/19 23:35	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*93*		*37 - 130*	*07/15/19 14:52*	*07/16/19 23:35*	*1*

Lab Sample ID: LCS 240-391263/20-A
Matrix: Water
Analysis Batch: 391441

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 391263

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics [C10 - C28]	2000	1770		ug/L		89	56 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl	*94*		*37 - 130*

Method: EPA 9040C - pH

Lab Sample ID: LCS 180-277854/1
Matrix: Solid
Analysis Batch: 277854

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

Method: EPA 9040C - pH (Continued)

Lab Sample ID: LCS 180-277961/1
Matrix: Solid
Analysis Batch: 277961

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

Lab Sample ID: LCS 180-278091/1
Matrix: Solid
Analysis Batch: 278091

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

Lab Sample ID: LCS 180-278504/1
Matrix: Solid
Analysis Batch: 278504

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

Lab Sample ID: LCS 180-279182/1
Matrix: Solid
Analysis Batch: 279182

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

Lab Sample ID: LCS 180-280486/1
Matrix: Solid
Analysis Batch: 280486

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

Lab Sample ID: LCS 180-281963/1
Matrix: Solid
Analysis Batch: 281963

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

Lab Sample ID: LCS 180-282773/1
Matrix: Solid
Analysis Batch: 282773

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

Lab Sample ID: LCS 180-284773/1
Matrix: Solid
Analysis Batch: 284773

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

Method: EPA 9040C - pH

Lab Sample ID: 180-89564-1 DU
Matrix: Solid
Analysis Batch: 277854

Client Sample ID: TO-ISS-AK-01 T01
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	10.3		10.3		SU		0	2

Lab Sample ID: 180-89564-2 DU
Matrix: Solid
Analysis Batch: 277961

Client Sample ID: TO-ISS-AK-01 T02
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	11.6		11.6		SU		0	2

Lab Sample ID: 180-89564-3 DU
Matrix: Solid
Analysis Batch: 278091

Client Sample ID: TO-ISS-AK-01 T03
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	11.4		11.4		SU		0.09	2

Lab Sample ID: 180-89564-4 DU
Matrix: Solid
Analysis Batch: 278504

Client Sample ID: TO-ISS-AK-01 T04
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	11.7		11.7		SU		0.09	2

Lab Sample ID: 180-89564-5 DU
Matrix: Solid
Analysis Batch: 279182

Client Sample ID: TO-ISS-AK-01 T05
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	11.7		11.7		SU		0	2

Lab Sample ID: 180-89564-6 DU
Matrix: Solid
Analysis Batch: 280486

Client Sample ID: TO-ISS-AK-01 T06
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	11.8		11.8		SU		0.08	2

Lab Sample ID: 180-89564-7 DU
Matrix: Solid
Analysis Batch: 281963

Client Sample ID: TO-ISS-AK-01 T07
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	11.6		11.6		SU		0.09	2

Lab Sample ID: 180-89564-8 DU
Matrix: Solid
Analysis Batch: 282773

Client Sample ID: TO-ISS-AK-01 T08
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	11.5		11.5		SU		0	2

Method: EPA 9040C - pH

Lab Sample ID: 180-89564-9 DU
Matrix: Solid
Analysis Batch: 284773

Client Sample ID: TO-ISS-AK-01 T09
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH	11.4			11.4		SU				0.2	2

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 180-277857/2
Matrix: Solid
Analysis Batch: 277857

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			05/06/19 10:15	1

Lab Sample ID: LCS 180-277857/1
Matrix: Solid
Analysis Batch: 277857

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Specific Conductance			84.0	86.3		umhos/cm		103	90 - 110		

Lab Sample ID: MB 180-277964/2
Matrix: Solid
Analysis Batch: 277964

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			05/07/19 08:15	1

Lab Sample ID: LCS 180-277964/1
Matrix: Solid
Analysis Batch: 277964

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Specific Conductance			84.0	84.0		umhos/cm		100	90 - 110		

Lab Sample ID: MB 180-278095/2
Matrix: Solid
Analysis Batch: 278095

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			05/08/19 08:15	1

Lab Sample ID: LCS 180-278095/1
Matrix: Solid
Analysis Batch: 278095

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Specific Conductance			84.0	84.0		umhos/cm		100	90 - 110		

Method: SM 2510B - Conductivity, Specific Conductance (Continued)

Lab Sample ID: MB 180-278507/2
Matrix: Solid
Analysis Batch: 278507

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			05/13/19 08:15	1

Lab Sample ID: LCS 180-278507/1
Matrix: Solid
Analysis Batch: 278507

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	84.0	83.9		umhos/cm		100	90 - 110

Lab Sample ID: MB 180-279184/2
Matrix: Solid
Analysis Batch: 279184

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			05/20/19 08:15	1

Lab Sample ID: LCS 180-279184/1
Matrix: Solid
Analysis Batch: 279184

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	84.0	84.6		umhos/cm		101	90 - 110

Lab Sample ID: MB 180-280488/2
Matrix: Solid
Analysis Batch: 280488

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			06/03/19 08:15	1

Lab Sample ID: LCS 180-280488/1
Matrix: Solid
Analysis Batch: 280488

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	84.0	84.2		umhos/cm		100	90 - 110

Lab Sample ID: MB 180-281966/2
Matrix: Solid
Analysis Batch: 281966

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			06/17/19 08:15	1

Lab Sample ID: LCS 180-281966/1
Matrix: Solid
Analysis Batch: 281966

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	84.0	84.1		umhos/cm		100	90 - 110

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 180-282776/2
Matrix: Solid
Analysis Batch: 282776

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			06/24/19 08:15	1

Lab Sample ID: LCS 180-282776/1
Matrix: Solid
Analysis Batch: 282776

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	84.0	84.6		umhos/cm		101	90 - 110

Lab Sample ID: MB 180-284784/2
Matrix: Solid
Analysis Batch: 284784

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			07/08/19 08:20	1

Lab Sample ID: LCS 180-284784/1
Matrix: Solid
Analysis Batch: 284784

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	84.0	87.1		umhos/cm		104	90 - 110

Lab Sample ID: 180-89564-1 DU
Matrix: Solid
Analysis Batch: 277857

Client Sample ID: TO-ISS-AK-01 T01
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Specific Conductance	170		175		umhos/cm		0.1	20

Lab Sample ID: 180-89564-2 DU
Matrix: Solid
Analysis Batch: 277964

Client Sample ID: TO-ISS-AK-01 T02
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Specific Conductance	760		762		umhos/cm		0.1	20

Lab Sample ID: 180-89564-3 DU
Matrix: Solid
Analysis Batch: 278095

Client Sample ID: TO-ISS-AK-01 T03
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Specific Conductance	550		551		umhos/cm		0.1	20

Lab Sample ID: 180-89564-4 DU
Matrix: Solid
Analysis Batch: 278507

Client Sample ID: TO-ISS-AK-01 T04
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Specific Conductance	1200		1210		umhos/cm		0.2	20

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: 180-89564-5 DU
Matrix: Solid
Analysis Batch: 279184

Client Sample ID: TO-ISS-AK-01 T05
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Specific Conductance	1100			1090		umhos/cm				0.3	20

Lab Sample ID: 180-89564-6 DU
Matrix: Solid
Analysis Batch: 280488

Client Sample ID: TO-ISS-AK-01 T06
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Specific Conductance	1200			1240		umhos/cm				0.3	20

Lab Sample ID: 180-89564-7 DU
Matrix: Solid
Analysis Batch: 281966

Client Sample ID: TO-ISS-AK-01 T07
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Specific Conductance	1100			1090		umhos/cm				0.4	20

Lab Sample ID: 180-89564-8 DU
Matrix: Solid
Analysis Batch: 282776

Client Sample ID: TO-ISS-AK-01 T08
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Specific Conductance	740			738		umhos/cm				0.05	20

Lab Sample ID: 180-89564-9 DU
Matrix: Solid
Analysis Batch: 284784

Client Sample ID: TO-ISS-AK-01 T09
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Specific Conductance	620			626		umhos/cm				0.8	20

Method: SM 2580B - Reduction-Oxidation (REDOX) Potential

Lab Sample ID: LCS 180-277856/1
Matrix: Solid
Analysis Batch: 277856

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Oxidation Reduction Potential			475	472		millivolts		99	90 - 110		

Lab Sample ID: LCS 180-277963/1
Matrix: Solid
Analysis Batch: 277963

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Oxidation Reduction Potential			475	476		millivolts		100	90 - 110		

Method: SM 2580B - Reduction-Oxidation (REDOX) Potential (Continued)

Lab Sample ID: LCS 180-278093/1
Matrix: Solid
Analysis Batch: 278093

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Oxidation Reduction Potential	475	475		millivolts		100	90 - 110

Lab Sample ID: LCS 180-278506/1
Matrix: Solid
Analysis Batch: 278506

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Oxidation Reduction Potential	475	472		millivolts		99	90 - 110

Lab Sample ID: LCS 180-279183/1
Matrix: Solid
Analysis Batch: 279183

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Oxidation Reduction Potential	475	475		millivolts		100	90 - 110

Lab Sample ID: LCS 180-280487/1
Matrix: Solid
Analysis Batch: 280487

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Oxidation Reduction Potential	475	476		millivolts		100	90 - 110

Lab Sample ID: LCS 180-281964/1
Matrix: Solid
Analysis Batch: 281964

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Oxidation Reduction Potential	475	475		millivolts		100	90 - 110

Lab Sample ID: LCS 180-282774/1
Matrix: Solid
Analysis Batch: 282774

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Oxidation Reduction Potential	475	477		millivolts		100	90 - 110

Lab Sample ID: LCS 180-284783/1
Matrix: Solid
Analysis Batch: 284783

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Oxidation Reduction Potential	475	479		millivolts		101	90 - 110

Lab Sample ID: 180-89564-1 DU
Matrix: Solid
Analysis Batch: 277856

Client Sample ID: TO-ISS-AK-01 T01
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Oxidation Reduction Potential	530		535		millivolts		0.6	20

Method: SM 2580B - Reduction-Oxidation (REDOX) Potential

Lab Sample ID: 180-89564-2 DU
Matrix: Solid
Analysis Batch: 277963

Client Sample ID: TO-ISS-AK-01 T02
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Oxidation Reduction Potential	180		176		millivolts		2	20

Lab Sample ID: 180-89564-3 DU
Matrix: Solid
Analysis Batch: 278093

Client Sample ID: TO-ISS-AK-01 T03
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Oxidation Reduction Potential	220		219		millivolts		2	20

Lab Sample ID: 180-89564-4 DU
Matrix: Solid
Analysis Batch: 278506

Client Sample ID: TO-ISS-AK-01 T04
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Oxidation Reduction Potential	180		172		millivolts		2	20

Lab Sample ID: 180-89564-5 DU
Matrix: Solid
Analysis Batch: 279183

Client Sample ID: TO-ISS-AK-01 T05
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Oxidation Reduction Potential	140		138		millivolts		2	20

Lab Sample ID: 180-89564-6 DU
Matrix: Solid
Analysis Batch: 280487

Client Sample ID: TO-ISS-AK-01 T06
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Oxidation Reduction Potential	160		154		millivolts		2	20

Lab Sample ID: 180-89564-7 DU
Matrix: Solid
Analysis Batch: 281964

Client Sample ID: TO-ISS-AK-01 T07
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Oxidation Reduction Potential	170		173		millivolts		0.6	20

Lab Sample ID: 180-89564-8 DU
Matrix: Solid
Analysis Batch: 282774

Client Sample ID: TO-ISS-AK-01 T08
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Oxidation Reduction Potential	190		190		millivolts		2	20

Lab Sample ID: 180-89564-9 DU
Matrix: Solid
Analysis Batch: 284783

Client Sample ID: TO-ISS-AK-01 T09
Prep Type: Leach

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Oxidation Reduction Potential	250		246		millivolts		0.4	20

GC/MS VOA

Leach Batch: 277812

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-1	TO-ISS-AK-01 T01	Leach	Solid	1315	
180-89564-10	TO-ISS-AK-03 T01	Leach	Solid	1315	
180-89564-19	TO-ISS-BT-01 T01	Leach	Solid	1315	
180-89564-28	TO-ISS-BT-03 T01	Leach	Solid	1315	
180-89564-73	BLANK T01	Leach	Solid	1315	

Leach Batch: 277830

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-2	TO-ISS-AK-01 T02	Leach	Solid	1315	
180-89564-11	TO-ISS-AK-03 T02	Leach	Solid	1315	
180-89564-20	TO-ISS-BT-01 T02	Leach	Solid	1315	
180-89564-29	TO-ISS-BT-03 T02	Leach	Solid	1315	
180-89564-74	BLANK T02	Leach	Solid	1315	

Leach Batch: 277863

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-3	TO-ISS-AK-01 T03	Leach	Solid	1315	
180-89564-12	TO-ISS-AK-03 T03	Leach	Solid	1315	
180-89564-21	TO-ISS-BT-01 T03	Leach	Solid	1315	
180-89564-30	TO-ISS-BT-03 T03	Leach	Solid	1315	
180-89564-75	BLANK T03	Leach	Solid	1315	

Leach Batch: 277865

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-4	TO-ISS-AK-01 T04	Leach	Solid	1315	
180-89564-13	TO-ISS-AK-03 T04	Leach	Solid	1315	
180-89564-22	TO-ISS-BT-01 T04	Leach	Solid	1315	
180-89564-31	TO-ISS-BT-03 T04	Leach	Solid	1315	
180-89564-76	BLANK T04	Leach	Solid	1315	

Leach Batch: 277866

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-5	TO-ISS-AK-01 T05	Leach	Solid	1315	
180-89564-14	TO-ISS-AK-03 T05	Leach	Solid	1315	
180-89564-23	TO-ISS-BT-01 T05	Leach	Solid	1315	
180-89564-32	TO-ISS-BT-03 T05	Leach	Solid	1315	
180-89564-77	BLANK T05	Leach	Solid	1315	

Leach Batch: 277868

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-6	TO-ISS-AK-01 T06	Leach	Solid	1315	
180-89564-15	TO-ISS-AK-03 T06	Leach	Solid	1315	
180-89564-24	TO-ISS-BT-01 T06	Leach	Solid	1315	
180-89564-33	TO-ISS-BT-03 T06	Leach	Solid	1315	
180-89564-78	BLANK T06	Leach	Solid	1315	
180-89564-6 MS	TO-ISS-AK-01 T06	Leach	Solid	1315	
180-89564-6 MSD	TO-ISS-AK-01 T06	Leach	Solid	1315	

Leach Batch: 277869

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-7	TO-ISS-AK-01 T07	Leach	Solid	1315	

GC/MS VOA (Continued)

Leach Batch: 277869 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-16	TO-ISS-AK-03 T07	Leach	Solid	1315	
180-89564-25	TO-ISS-BT-01 T07	Leach	Solid	1315	
180-89564-34	TO-ISS-BT-03 T07	Leach	Solid	1315	
180-89564-79	BLANK T07	Leach	Solid	1315	

Leach Batch: 277871

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-8	TO-ISS-AK-01 T08	Leach	Solid	1315	
180-89564-17	TO-ISS-AK-03 T08	Leach	Solid	1315	
180-89564-26	TO-ISS-BT-01 T08	Leach	Solid	1315	
180-89564-35	TO-ISS-BT-03 T08	Leach	Solid	1315	
180-89564-80	BLANK T08	Leach	Solid	1315	

Leach Batch: 277872

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-9	TO-ISS-AK-01 T09	Leach	Solid	1315	
180-89564-18	TO-ISS-AK-03 T09	Leach	Solid	1315	
180-89564-27	TO-ISS-BT-01 T09	Leach	Solid	1315	
180-89564-36	TO-ISS-BT-03 T09	Leach	Solid	1315	
180-89564-81	BLANK T09	Leach	Solid	1315	
180-89564-27 MS	TO-ISS-BT-01 T09	Leach	Solid	1315	
180-89564-27 MSD	TO-ISS-BT-01 T09	Leach	Solid	1315	

Analysis Batch: 278065

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-1	TO-ISS-AK-01 T01	Leach	Solid	EPA 8260C	277812
180-89564-2	TO-ISS-AK-01 T02	Leach	Solid	EPA 8260C	277830
180-89564-10	TO-ISS-AK-03 T01	Leach	Solid	EPA 8260C	277812
180-89564-11	TO-ISS-AK-03 T02	Leach	Solid	EPA 8260C	277830
180-89564-19	TO-ISS-BT-01 T01	Leach	Solid	EPA 8260C	277812
180-89564-20	TO-ISS-BT-01 T02	Leach	Solid	EPA 8260C	277830
180-89564-28	TO-ISS-BT-03 T01	Leach	Solid	EPA 8260C	277812
180-89564-29	TO-ISS-BT-03 T02	Leach	Solid	EPA 8260C	277830
180-89564-73	BLANK T01	Leach	Solid	EPA 8260C	277812
180-89564-74	BLANK T02	Leach	Solid	EPA 8260C	277830
MB 180-278065/8	Method Blank	Total/NA	Solid	EPA 8260C	
LCS 180-278065/20	Lab Control Sample	Total/NA	Solid	EPA 8260C	

Analysis Batch: 278179

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-3	TO-ISS-AK-01 T03	Leach	Solid	EPA 8260C	277863
180-89564-12	TO-ISS-AK-03 T03	Leach	Solid	EPA 8260C	277863
180-89564-21	TO-ISS-BT-01 T03	Leach	Solid	EPA 8260C	277863
180-89564-30	TO-ISS-BT-03 T03	Leach	Solid	EPA 8260C	277863
180-89564-75	BLANK T03	Leach	Solid	EPA 8260C	277863
MB 180-278179/5	Method Blank	Total/NA	Solid	EPA 8260C	
LCS 180-278179/3	Lab Control Sample	Total/NA	Solid	EPA 8260C	

Analysis Batch: 278479

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-4	TO-ISS-AK-01 T04	Leach	Solid	EPA 8260C	277865

GC/MS VOA (Continued)

Analysis Batch: 278479 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-13	TO-ISS-AK-03 T04	Leach	Solid	EPA 8260C	277865
180-89564-22	TO-ISS-BT-01 T04	Leach	Solid	EPA 8260C	277865
180-89564-31	TO-ISS-BT-03 T04	Leach	Solid	EPA 8260C	277865
180-89564-76	BLANK T04	Leach	Solid	EPA 8260C	277865
MB 180-278479/7	Method Blank	Total/NA	Solid	EPA 8260C	
LCS 180-278479/17	Lab Control Sample	Total/NA	Solid	EPA 8260C	

Analysis Batch: 279149

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-5	TO-ISS-AK-01 T05	Leach	Solid	EPA 8260C	277866
180-89564-14	TO-ISS-AK-03 T05	Leach	Solid	EPA 8260C	277866
180-89564-23	TO-ISS-BT-01 T05	Leach	Solid	EPA 8260C	277866
180-89564-32	TO-ISS-BT-03 T05	Leach	Solid	EPA 8260C	277866
180-89564-77	BLANK T05	Leach	Solid	EPA 8260C	277866
MB 180-279149/6	Method Blank	Total/NA	Solid	EPA 8260C	
LCS 180-279149/4	Lab Control Sample	Total/NA	Solid	EPA 8260C	

Analysis Batch: 280453

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-6	TO-ISS-AK-01 T06	Leach	Solid	EPA 8260C	277868
180-89564-15	TO-ISS-AK-03 T06	Leach	Solid	EPA 8260C	277868
180-89564-24	TO-ISS-BT-01 T06	Leach	Solid	EPA 8260C	277868
180-89564-33	TO-ISS-BT-03 T06	Leach	Solid	EPA 8260C	277868
180-89564-78	BLANK T06	Leach	Solid	EPA 8260C	277868
MB 180-280453/8	Method Blank	Total/NA	Solid	EPA 8260C	
LCS 180-280453/15	Lab Control Sample	Total/NA	Solid	EPA 8260C	
180-89564-6 MS	TO-ISS-AK-01 T06	Leach	Solid	EPA 8260C	277868
180-89564-6 MSD	TO-ISS-AK-01 T06	Leach	Solid	EPA 8260C	277868

Analysis Batch: 281902

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-7	TO-ISS-AK-01 T07	Leach	Solid	EPA 8260C	277869
180-89564-16	TO-ISS-AK-03 T07	Leach	Solid	EPA 8260C	277869
180-89564-25	TO-ISS-BT-01 T07	Leach	Solid	EPA 8260C	277869
180-89564-34	TO-ISS-BT-03 T07	Leach	Solid	EPA 8260C	277869
180-89564-79	BLANK T07	Leach	Solid	EPA 8260C	277869
MB 180-281902/7	Method Blank	Total/NA	Solid	EPA 8260C	
LCS 180-281902/5	Lab Control Sample	Total/NA	Solid	EPA 8260C	

Analysis Batch: 282660

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-8	TO-ISS-AK-01 T08	Leach	Solid	EPA 8260C	277871
180-89564-17	TO-ISS-AK-03 T08	Leach	Solid	EPA 8260C	277871
180-89564-26	TO-ISS-BT-01 T08	Leach	Solid	EPA 8260C	277871
180-89564-35	TO-ISS-BT-03 T08	Leach	Solid	EPA 8260C	277871
180-89564-80	BLANK T08	Leach	Solid	EPA 8260C	277871
MB 180-282660/7	Method Blank	Total/NA	Solid	EPA 8260C	
LCS 180-282660/4	Lab Control Sample	Total/NA	Solid	EPA 8260C	

GC/MS VOA

Analysis Batch: 284331

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-9	TO-ISS-AK-01 T09	Leach	Solid	EPA 8260C	277872
180-89564-18	TO-ISS-AK-03 T09	Leach	Solid	EPA 8260C	277872
180-89564-27	TO-ISS-BT-01 T09	Leach	Solid	EPA 8260C	277872
180-89564-36	TO-ISS-BT-03 T09	Leach	Solid	EPA 8260C	277872
180-89564-81	BLANK T09	Leach	Solid	EPA 8260C	277872
MB 180-284331/16	Method Blank	Total/NA	Solid	EPA 8260C	
LCS 180-284331/24	Lab Control Sample	Total/NA	Solid	EPA 8260C	
180-89564-27 MS	TO-ISS-BT-01 T09	Leach	Solid	EPA 8260C	277872
180-89564-27 MSD	TO-ISS-BT-01 T09	Leach	Solid	EPA 8260C	277872

GC VOA

Analysis Batch: 380447

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-37	TO-ISS-AK-01 T01	Total/NA	Water	8015D	
180-89564-46	TO-ISS-AK-03 T01	Total/NA	Water	8015D	
180-89564-55	TO-ISS-BT-01 T01	Total/NA	Water	8015D	
180-89564-64	TO-ISS-BT-03 T01	Total/NA	Water	8015D	
180-89564-82	BLANK T01	Total/NA	Water	8015D	
MB 240-380447/3	Method Blank	Total/NA	Water	8015D	
LCS 240-380447/4	Lab Control Sample	Total/NA	Water	8015D	

Analysis Batch: 380660

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-38	TO-ISS-AK-01 T02	Total/NA	Water	8015D	
180-89564-39	TO-ISS-AK-01 T03	Total/NA	Water	8015D	
180-89564-47	TO-ISS-AK-03 T02	Total/NA	Water	8015D	
180-89564-48	TO-ISS-AK-03 T03	Total/NA	Water	8015D	
180-89564-56	TO-ISS-BT-01 T02	Total/NA	Water	8015D	
180-89564-57	TO-ISS-BT-01 T03	Total/NA	Water	8015D	
180-89564-65	TO-ISS-BT-03 T02	Total/NA	Water	8015D	
180-89564-66	TO-ISS-BT-03 T03	Total/NA	Water	8015D	
180-89564-83	BLANK T02	Total/NA	Water	8015D	
180-89564-84	BLANK T03	Total/NA	Water	8015D	
MB 240-380660/3	Method Blank	Total/NA	Water	8015D	
LCS 240-380660/4	Lab Control Sample	Total/NA	Water	8015D	
180-89564-47 MS	TO-ISS-AK-03 T02	Total/NA	Water	8015D	
180-89564-47 MSD	TO-ISS-AK-03 T02	Total/NA	Water	8015D	

Analysis Batch: 381358

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-40	TO-ISS-AK-01 T04	Total/NA	Water	8015D	
180-89564-49	TO-ISS-AK-03 T04	Total/NA	Water	8015D	
180-89564-58	TO-ISS-BT-01 T04	Total/NA	Water	8015D	
180-89564-67	TO-ISS-BT-03 T04	Total/NA	Water	8015D	
180-89564-85	BLANK T04	Total/NA	Water	8015D	
MB 240-381358/4	Method Blank	Total/NA	Water	8015D	
LCS 240-381358/5	Lab Control Sample	Total/NA	Water	8015D	
180-89564-40 MS	TO-ISS-AK-01 T04	Total/NA	Water	8015D	
180-89564-40 MSD	TO-ISS-AK-01 T04	Total/NA	Water	8015D	

GC VOA

Analysis Batch: 382529

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-41	TO-ISS-AK-01 T05	Total/NA	Water	8015D	
180-89564-50	TO-ISS-AK-03 T05	Total/NA	Water	8015D	
180-89564-59	TO-ISS-BT-01 T05	Total/NA	Water	8015D	
180-89564-68	TO-ISS-BT-03 T05	Total/NA	Water	8015D	
180-89564-86	BLANK T05	Total/NA	Water	8015D	
MB 240-382529/4	Method Blank	Total/NA	Water	8015D	
LCS 240-382529/5	Lab Control Sample	Total/NA	Water	8015D	

Analysis Batch: 384863

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-42	TO-ISS-AK-01 T06	Total/NA	Water	8015D	
180-89564-51	TO-ISS-AK-03 T06	Total/NA	Water	8015D	
180-89564-60	TO-ISS-BT-01 T06	Total/NA	Water	8015D	
180-89564-69	TO-ISS-BT-03 T06	Total/NA	Water	8015D	
180-89564-87	BLANK T06	Total/NA	Water	8015D	
MB 240-384863/4	Method Blank	Total/NA	Water	8015D	
LCS 240-384863/5	Lab Control Sample	Total/NA	Water	8015D	

Analysis Batch: 387560

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-43	TO-ISS-AK-01 T07	Total/NA	Water	8015D	
180-89564-52	TO-ISS-AK-03 T07	Total/NA	Water	8015D	
180-89564-61	TO-ISS-BT-01 T07	Total/NA	Water	8015D	
180-89564-70	TO-ISS-BT-03 T07	Total/NA	Water	8015D	
180-89564-88	BLANK T07	Total/NA	Water	8015D	
MB 240-387560/6	Method Blank	Total/NA	Water	8015D	
LCS 240-387560/7	Lab Control Sample	Total/NA	Water	8015D	
180-89564-43 MS	TO-ISS-AK-01 T07	Total/NA	Water	8015D	
180-89564-43 MSD	TO-ISS-AK-01 T07	Total/NA	Water	8015D	

Analysis Batch: 388323

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-44	TO-ISS-AK-01 T08	Total/NA	Water	8015D	
180-89564-53	TO-ISS-AK-03 T08	Total/NA	Water	8015D	
180-89564-62	TO-ISS-BT-01 T08	Total/NA	Water	8015D	
180-89564-71	TO-ISS-BT-03 T08	Total/NA	Water	8015D	
180-89564-89	BLANK T08	Total/NA	Water	8015D	
MB 240-388323/3	Method Blank	Total/NA	Water	8015D	
LCS 240-388323/4	Lab Control Sample	Total/NA	Water	8015D	

Analysis Batch: 390440

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-45	TO-ISS-AK-01 T09	Total/NA	Water	8015D	
180-89564-54	TO-ISS-AK-03 T09	Total/NA	Water	8015D	
180-89564-63	TO-ISS-BT-01 T09	Total/NA	Water	8015D	
180-89564-72	TO-ISS-BT-03 T09	Total/NA	Water	8015D	
180-89564-90	BLANK T09	Total/NA	Water	8015D	
MB 240-390440/4	Method Blank	Total/NA	Water	8015D	
LCS 240-390440/5	Lab Control Sample	Total/NA	Water	8015D	
180-89564-45 MS	TO-ISS-AK-01 T09	Total/NA	Water	8015D	
180-89564-45 MSD	TO-ISS-AK-01 T09	Total/NA	Water	8015D	

GC Semi VOA

Prep Batch: 380404

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-37	TO-ISS-AK-01 T01	Total/NA	Water	3520C	
180-89564-38	TO-ISS-AK-01 T02	Total/NA	Water	3520C	
180-89564-46	TO-ISS-AK-03 T01	Total/NA	Water	3520C	
180-89564-47	TO-ISS-AK-03 T02	Total/NA	Water	3520C	
180-89564-55	TO-ISS-BT-01 T01	Total/NA	Water	3520C	
180-89564-56	TO-ISS-BT-01 T02	Total/NA	Water	3520C	
180-89564-64	TO-ISS-BT-03 T01	Total/NA	Water	3520C	
180-89564-65	TO-ISS-BT-03 T02	Total/NA	Water	3520C	
180-89564-82	BLANK T01	Total/NA	Water	3520C	
180-89564-83	BLANK T02	Total/NA	Water	3520C	
MB 240-380404/21-A	Method Blank	Total/NA	Water	3520C	
LCS 240-380404/22-A	Lab Control Sample	Total/NA	Water	3520C	

Analysis Batch: 380665

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-37	TO-ISS-AK-01 T01	Total/NA	Water	8015D	380404
180-89564-38	TO-ISS-AK-01 T02	Total/NA	Water	8015D	380404
180-89564-46	TO-ISS-AK-03 T01	Total/NA	Water	8015D	380404
180-89564-47	TO-ISS-AK-03 T02	Total/NA	Water	8015D	380404
180-89564-55	TO-ISS-BT-01 T01	Total/NA	Water	8015D	380404
180-89564-56	TO-ISS-BT-01 T02	Total/NA	Water	8015D	380404
180-89564-64	TO-ISS-BT-03 T01	Total/NA	Water	8015D	380404
180-89564-65	TO-ISS-BT-03 T02	Total/NA	Water	8015D	380404
180-89564-82	BLANK T01	Total/NA	Water	8015D	380404
180-89564-83	BLANK T02	Total/NA	Water	8015D	380404
MB 240-380404/21-A	Method Blank	Total/NA	Water	8015D	380404
LCS 240-380404/22-A	Lab Control Sample	Total/NA	Water	8015D	380404

Prep Batch: 380685

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-39	TO-ISS-AK-01 T03	Total/NA	Water	3520C	
180-89564-48	TO-ISS-AK-03 T03	Total/NA	Water	3520C	
180-89564-57	TO-ISS-BT-01 T03	Total/NA	Water	3520C	
180-89564-66	TO-ISS-BT-03 T03	Total/NA	Water	3520C	
180-89564-84	BLANK T03	Total/NA	Water	3520C	
MB 240-380685/11-A	Method Blank	Total/NA	Water	3520C	
LCS 240-380685/12-A	Lab Control Sample	Total/NA	Water	3520C	

Analysis Batch: 380971

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-39	TO-ISS-AK-01 T03	Total/NA	Water	8015D	380685
180-89564-48	TO-ISS-AK-03 T03	Total/NA	Water	8015D	380685
180-89564-57	TO-ISS-BT-01 T03	Total/NA	Water	8015D	380685
180-89564-66	TO-ISS-BT-03 T03	Total/NA	Water	8015D	380685
180-89564-84	BLANK T03	Total/NA	Water	8015D	380685
MB 240-380685/11-A	Method Blank	Total/NA	Water	8015D	380685
LCS 240-380685/12-A	Lab Control Sample	Total/NA	Water	8015D	380685

Prep Batch: 381431

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-40	TO-ISS-AK-01 T04	Total/NA	Water	3510C	

GC Semi VOA (Continued)

Prep Batch: 381431 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-49	TO-ISS-AK-03 T04	Total/NA	Water	3510C	
180-89564-58	TO-ISS-BT-01 T04	Total/NA	Water	3510C	
180-89564-67	TO-ISS-BT-03 T04	Total/NA	Water	3510C	
180-89564-85	BLANK T04	Total/NA	Water	3510C	
MB 240-381431/15-A	Method Blank	Total/NA	Water	3510C	
LCS 240-381431/16-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 381700

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-40	TO-ISS-AK-01 T04	Total/NA	Water	8015D	381431
180-89564-49	TO-ISS-AK-03 T04	Total/NA	Water	8015D	381431
180-89564-58	TO-ISS-BT-01 T04	Total/NA	Water	8015D	381431
180-89564-67	TO-ISS-BT-03 T04	Total/NA	Water	8015D	381431
180-89564-85	BLANK T04	Total/NA	Water	8015D	381431
MB 240-381431/15-A	Method Blank	Total/NA	Water	8015D	381431
LCS 240-381431/16-A	Lab Control Sample	Total/NA	Water	8015D	381431

Prep Batch: 382856

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-41	TO-ISS-AK-01 T05	Total/NA	Water	3510C	
180-89564-50	TO-ISS-AK-03 T05	Total/NA	Water	3510C	
180-89564-59	TO-ISS-BT-01 T05	Total/NA	Water	3510C	
180-89564-68	TO-ISS-BT-03 T05	Total/NA	Water	3510C	
180-89564-86	BLANK T05	Total/NA	Water	3510C	
MB 240-382856/11-A	Method Blank	Total/NA	Water	3510C	
LCS 240-382856/12-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 382883

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-41	TO-ISS-AK-01 T05	Total/NA	Water	8015D	382856
180-89564-50	TO-ISS-AK-03 T05	Total/NA	Water	8015D	382856
180-89564-59	TO-ISS-BT-01 T05	Total/NA	Water	8015D	382856
180-89564-68	TO-ISS-BT-03 T05	Total/NA	Water	8015D	382856
180-89564-86	BLANK T05	Total/NA	Water	8015D	382856
MB 240-382856/11-A	Method Blank	Total/NA	Water	8015D	382856
LCS 240-382856/12-A	Lab Control Sample	Total/NA	Water	8015D	382856

Prep Batch: 384644

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-42	TO-ISS-AK-01 T06	Total/NA	Water	3510C	
180-89564-51	TO-ISS-AK-03 T06	Total/NA	Water	3510C	
180-89564-60	TO-ISS-BT-01 T06	Total/NA	Water	3510C	
180-89564-69	TO-ISS-BT-03 T06	Total/NA	Water	3510C	
180-89564-87	BLANK T06	Total/NA	Water	3510C	
MB 240-384644/15-A	Method Blank	Total/NA	Water	3510C	
LCS 240-384644/16-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 385091

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-42	TO-ISS-AK-01 T06	Total/NA	Water	8015D	384644
180-89564-51	TO-ISS-AK-03 T06	Total/NA	Water	8015D	384644

GC Semi VOA (Continued)

Analysis Batch: 385091 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-60	TO-ISS-BT-01 T06	Total/NA	Water	8015D	384644
180-89564-69	TO-ISS-BT-03 T06	Total/NA	Water	8015D	384644
180-89564-87	BLANK T06	Total/NA	Water	8015D	384644
MB 240-384644/15-A	Method Blank	Total/NA	Water	8015D	384644
LCS 240-384644/16-A	Lab Control Sample	Total/NA	Water	8015D	384644

Prep Batch: 387359

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-43	TO-ISS-AK-01 T07	Total/NA	Water	3510C	
180-89564-52	TO-ISS-AK-03 T07	Total/NA	Water	3510C	
180-89564-61	TO-ISS-BT-01 T07	Total/NA	Water	3510C	
180-89564-70	TO-ISS-BT-03 T07	Total/NA	Water	3510C	
180-89564-88	BLANK T07	Total/NA	Water	3510C	

Analysis Batch: 387934

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-43	TO-ISS-AK-01 T07	Total/NA	Water	8015D	387359
180-89564-52	TO-ISS-AK-03 T07	Total/NA	Water	8015D	387359
180-89564-61	TO-ISS-BT-01 T07	Total/NA	Water	8015D	387359
180-89564-70	TO-ISS-BT-03 T07	Total/NA	Water	8015D	387359
180-89564-88	BLANK T07	Total/NA	Water	8015D	387359

Prep Batch: 388426

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-44	TO-ISS-AK-01 T08	Total/NA	Water	3510C	
180-89564-53	TO-ISS-AK-03 T08	Total/NA	Water	3510C	
180-89564-62	TO-ISS-BT-01 T08	Total/NA	Water	3510C	
180-89564-71	TO-ISS-BT-03 T08	Total/NA	Water	3510C	
180-89564-89	BLANK T08	Total/NA	Water	3510C	
MB 240-388426/12-A	Method Blank	Total/NA	Water	3510C	
LCS 240-388426/13-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 388696

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-44	TO-ISS-AK-01 T08	Total/NA	Water	8015D	388426
180-89564-53	TO-ISS-AK-03 T08	Total/NA	Water	8015D	388426
180-89564-62	TO-ISS-BT-01 T08	Total/NA	Water	8015D	388426
180-89564-71	TO-ISS-BT-03 T08	Total/NA	Water	8015D	388426
180-89564-89	BLANK T08	Total/NA	Water	8015D	388426
MB 240-388426/12-A	Method Blank	Total/NA	Water	8015D	388426
LCS 240-388426/13-A	Lab Control Sample	Total/NA	Water	8015D	388426

Prep Batch: 391263

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-45	TO-ISS-AK-01 T09	Total/NA	Water	3510C	
180-89564-54	TO-ISS-AK-03 T09	Total/NA	Water	3510C	
180-89564-63	TO-ISS-BT-01 T09	Total/NA	Water	3510C	
180-89564-72	TO-ISS-BT-03 T09	Total/NA	Water	3510C	
180-89564-90	BLANK T09	Total/NA	Water	3510C	
MB 240-391263/19-A	Method Blank	Total/NA	Water	3510C	
LCS 240-391263/20-A	Lab Control Sample	Total/NA	Water	3510C	

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Analysis Batch: 391441

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-45	TO-ISS-AK-01 T09	Total/NA	Water	8015D	391263
180-89564-54	TO-ISS-AK-03 T09	Total/NA	Water	8015D	391263
180-89564-63	TO-ISS-BT-01 T09	Total/NA	Water	8015D	391263
180-89564-72	TO-ISS-BT-03 T09	Total/NA	Water	8015D	391263
180-89564-90	BLANK T09	Total/NA	Water	8015D	391263
MB 240-391263/19-A	Method Blank	Total/NA	Water	8015D	391263
LCS 240-391263/20-A	Lab Control Sample	Total/NA	Water	8015D	391263

General Chemistry

Leach Batch: 277812

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-1	TO-ISS-AK-01 T01	Leach	Solid	1315	
180-89564-10	TO-ISS-AK-03 T01	Leach	Solid	1315	
180-89564-19	TO-ISS-BT-01 T01	Leach	Solid	1315	
180-89564-28	TO-ISS-BT-03 T01	Leach	Solid	1315	
180-89564-73	BLANK T01	Leach	Solid	1315	
180-89564-1 DU	TO-ISS-AK-01 T01	Leach	Solid	1315	

Leach Batch: 277830

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-2	TO-ISS-AK-01 T02	Leach	Solid	1315	
180-89564-11	TO-ISS-AK-03 T02	Leach	Solid	1315	
180-89564-20	TO-ISS-BT-01 T02	Leach	Solid	1315	
180-89564-29	TO-ISS-BT-03 T02	Leach	Solid	1315	
180-89564-74	BLANK T02	Leach	Solid	1315	
180-89564-2 DU	TO-ISS-AK-01 T02	Leach	Solid	1315	

Analysis Batch: 277854

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-1	TO-ISS-AK-01 T01	Leach	Solid	EPA 9040C	277812
180-89564-10	TO-ISS-AK-03 T01	Leach	Solid	EPA 9040C	277812
180-89564-19	TO-ISS-BT-01 T01	Leach	Solid	EPA 9040C	277812
180-89564-28	TO-ISS-BT-03 T01	Leach	Solid	EPA 9040C	277812
180-89564-73	BLANK T01	Leach	Solid	EPA 9040C	277812
LCS 180-277854/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	
180-89564-1 DU	TO-ISS-AK-01 T01	Leach	Solid	EPA 9040C	277812

Analysis Batch: 277856

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-1	TO-ISS-AK-01 T01	Leach	Solid	SM 2580B	277812
180-89564-10	TO-ISS-AK-03 T01	Leach	Solid	SM 2580B	277812
180-89564-19	TO-ISS-BT-01 T01	Leach	Solid	SM 2580B	277812
180-89564-28	TO-ISS-BT-03 T01	Leach	Solid	SM 2580B	277812
180-89564-73	BLANK T01	Leach	Solid	SM 2580B	277812
LCS 180-277856/1	Lab Control Sample	Total/NA	Solid	SM 2580B	
180-89564-1 DU	TO-ISS-AK-01 T01	Leach	Solid	SM 2580B	277812

Analysis Batch: 277857

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-1	TO-ISS-AK-01 T01	Leach	Solid	SM 2510B	277812

General Chemistry (Continued)

Analysis Batch: 277857 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-10	TO-ISS-AK-03 T01	Leach	Solid	SM 2510B	277812
180-89564-19	TO-ISS-BT-01 T01	Leach	Solid	SM 2510B	277812
180-89564-28	TO-ISS-BT-03 T01	Leach	Solid	SM 2510B	277812
180-89564-73	BLANK T01	Leach	Solid	SM 2510B	277812
MB 180-277857/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-277857/1	Lab Control Sample	Total/NA	Solid	SM 2510B	
180-89564-1 DU	TO-ISS-AK-01 T01	Leach	Solid	SM 2510B	277812

Leach Batch: 277863

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-3	TO-ISS-AK-01 T03	Leach	Solid	1315	
180-89564-12	TO-ISS-AK-03 T03	Leach	Solid	1315	
180-89564-21	TO-ISS-BT-01 T03	Leach	Solid	1315	
180-89564-30	TO-ISS-BT-03 T03	Leach	Solid	1315	
180-89564-75	BLANK T03	Leach	Solid	1315	
180-89564-3 DU	TO-ISS-AK-01 T03	Leach	Solid	1315	

Leach Batch: 277865

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-4	TO-ISS-AK-01 T04	Leach	Solid	1315	
180-89564-13	TO-ISS-AK-03 T04	Leach	Solid	1315	
180-89564-22	TO-ISS-BT-01 T04	Leach	Solid	1315	
180-89564-31	TO-ISS-BT-03 T04	Leach	Solid	1315	
180-89564-76	BLANK T04	Leach	Solid	1315	
180-89564-4 DU	TO-ISS-AK-01 T04	Leach	Solid	1315	

Leach Batch: 277866

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-5	TO-ISS-AK-01 T05	Leach	Solid	1315	
180-89564-14	TO-ISS-AK-03 T05	Leach	Solid	1315	
180-89564-23	TO-ISS-BT-01 T05	Leach	Solid	1315	
180-89564-32	TO-ISS-BT-03 T05	Leach	Solid	1315	
180-89564-77	BLANK T05	Leach	Solid	1315	
180-89564-5 DU	TO-ISS-AK-01 T05	Leach	Solid	1315	

Leach Batch: 277868

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-6	TO-ISS-AK-01 T06	Leach	Solid	1315	
180-89564-15	TO-ISS-AK-03 T06	Leach	Solid	1315	
180-89564-24	TO-ISS-BT-01 T06	Leach	Solid	1315	
180-89564-33	TO-ISS-BT-03 T06	Leach	Solid	1315	
180-89564-78	BLANK T06	Leach	Solid	1315	
180-89564-6 DU	TO-ISS-AK-01 T06	Leach	Solid	1315	

Leach Batch: 277869

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-7	TO-ISS-AK-01 T07	Leach	Solid	1315	
180-89564-16	TO-ISS-AK-03 T07	Leach	Solid	1315	
180-89564-25	TO-ISS-BT-01 T07	Leach	Solid	1315	
180-89564-34	TO-ISS-BT-03 T07	Leach	Solid	1315	
180-89564-79	BLANK T07	Leach	Solid	1315	

General Chemistry (Continued)

Leach Batch: 277869 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-7 DU	TO-ISS-AK-01 T07	Leach	Solid	1315	

Leach Batch: 277871

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-8	TO-ISS-AK-01 T08	Leach	Solid	1315	
180-89564-17	TO-ISS-AK-03 T08	Leach	Solid	1315	
180-89564-26	TO-ISS-BT-01 T08	Leach	Solid	1315	
180-89564-35	TO-ISS-BT-03 T08	Leach	Solid	1315	
180-89564-80	BLANK T08	Leach	Solid	1315	
180-89564-8 DU	TO-ISS-AK-01 T08	Leach	Solid	1315	

Leach Batch: 277872

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-9	TO-ISS-AK-01 T09	Leach	Solid	1315	
180-89564-18	TO-ISS-AK-03 T09	Leach	Solid	1315	
180-89564-27	TO-ISS-BT-01 T09	Leach	Solid	1315	
180-89564-36	TO-ISS-BT-03 T09	Leach	Solid	1315	
180-89564-81	BLANK T09	Leach	Solid	1315	
180-89564-9 DU	TO-ISS-AK-01 T09	Leach	Solid	1315	

Analysis Batch: 277961

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-2	TO-ISS-AK-01 T02	Leach	Solid	EPA 9040C	277830
180-89564-11	TO-ISS-AK-03 T02	Leach	Solid	EPA 9040C	277830
180-89564-20	TO-ISS-BT-01 T02	Leach	Solid	EPA 9040C	277830
180-89564-29	TO-ISS-BT-03 T02	Leach	Solid	EPA 9040C	277830
180-89564-74	BLANK T02	Leach	Solid	EPA 9040C	277830
LCS 180-277961/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	
180-89564-2 DU	TO-ISS-AK-01 T02	Leach	Solid	EPA 9040C	277830

Analysis Batch: 277963

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-2	TO-ISS-AK-01 T02	Leach	Solid	SM 2580B	277830
180-89564-11	TO-ISS-AK-03 T02	Leach	Solid	SM 2580B	277830
180-89564-20	TO-ISS-BT-01 T02	Leach	Solid	SM 2580B	277830
180-89564-29	TO-ISS-BT-03 T02	Leach	Solid	SM 2580B	277830
180-89564-74	BLANK T02	Leach	Solid	SM 2580B	277830
LCS 180-277963/1	Lab Control Sample	Total/NA	Solid	SM 2580B	
180-89564-2 DU	TO-ISS-AK-01 T02	Leach	Solid	SM 2580B	277830

Analysis Batch: 277964

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-2	TO-ISS-AK-01 T02	Leach	Solid	SM 2510B	277830
180-89564-11	TO-ISS-AK-03 T02	Leach	Solid	SM 2510B	277830
180-89564-20	TO-ISS-BT-01 T02	Leach	Solid	SM 2510B	277830
180-89564-29	TO-ISS-BT-03 T02	Leach	Solid	SM 2510B	277830
180-89564-74	BLANK T02	Leach	Solid	SM 2510B	277830
MB 180-277964/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-277964/1	Lab Control Sample	Total/NA	Solid	SM 2510B	
180-89564-2 DU	TO-ISS-AK-01 T02	Leach	Solid	SM 2510B	277830

General Chemistry

Analysis Batch: 278000

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-1	TO-ISS-AK-01 T01	Total/NA	Solid	2540G	
180-89564-10	TO-ISS-AK-03 T01	Total/NA	Solid	2540G	
180-89564-19	TO-ISS-BT-01 T01	Total/NA	Solid	2540G	
180-89564-28	TO-ISS-BT-03 T01	Total/NA	Solid	2540G	

Analysis Batch: 278091

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-3	TO-ISS-AK-01 T03	Leach	Solid	EPA 9040C	277863
180-89564-12	TO-ISS-AK-03 T03	Leach	Solid	EPA 9040C	277863
180-89564-21	TO-ISS-BT-01 T03	Leach	Solid	EPA 9040C	277863
180-89564-30	TO-ISS-BT-03 T03	Leach	Solid	EPA 9040C	277863
180-89564-75	BLANK T03	Leach	Solid	EPA 9040C	277863
LCS 180-278091/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	
180-89564-3 DU	TO-ISS-AK-01 T03	Leach	Solid	EPA 9040C	277863

Analysis Batch: 278093

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-3	TO-ISS-AK-01 T03	Leach	Solid	SM 2580B	277863
180-89564-12	TO-ISS-AK-03 T03	Leach	Solid	SM 2580B	277863
180-89564-21	TO-ISS-BT-01 T03	Leach	Solid	SM 2580B	277863
180-89564-30	TO-ISS-BT-03 T03	Leach	Solid	SM 2580B	277863
180-89564-75	BLANK T03	Leach	Solid	SM 2580B	277863
LCS 180-278093/1	Lab Control Sample	Total/NA	Solid	SM 2580B	
180-89564-3 DU	TO-ISS-AK-01 T03	Leach	Solid	SM 2580B	277863

Analysis Batch: 278095

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-3	TO-ISS-AK-01 T03	Leach	Solid	SM 2510B	277863
180-89564-12	TO-ISS-AK-03 T03	Leach	Solid	SM 2510B	277863
180-89564-21	TO-ISS-BT-01 T03	Leach	Solid	SM 2510B	277863
180-89564-30	TO-ISS-BT-03 T03	Leach	Solid	SM 2510B	277863
180-89564-75	BLANK T03	Leach	Solid	SM 2510B	277863
MB 180-278095/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-278095/1	Lab Control Sample	Total/NA	Solid	SM 2510B	
180-89564-3 DU	TO-ISS-AK-01 T03	Leach	Solid	SM 2510B	277863

Analysis Batch: 278504

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-4	TO-ISS-AK-01 T04	Leach	Solid	EPA 9040C	277865
180-89564-13	TO-ISS-AK-03 T04	Leach	Solid	EPA 9040C	277865
180-89564-22	TO-ISS-BT-01 T04	Leach	Solid	EPA 9040C	277865
180-89564-31	TO-ISS-BT-03 T04	Leach	Solid	EPA 9040C	277865
180-89564-76	BLANK T04	Leach	Solid	EPA 9040C	277865
LCS 180-278504/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	
180-89564-4 DU	TO-ISS-AK-01 T04	Leach	Solid	EPA 9040C	277865

Analysis Batch: 278506

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-4	TO-ISS-AK-01 T04	Leach	Solid	SM 2580B	277865
180-89564-13	TO-ISS-AK-03 T04	Leach	Solid	SM 2580B	277865
180-89564-22	TO-ISS-BT-01 T04	Leach	Solid	SM 2580B	277865

General Chemistry (Continued)

Analysis Batch: 278506 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-31	TO-ISS-BT-03 T04	Leach	Solid	SM 2580B	277865
180-89564-76	BLANK T04	Leach	Solid	SM 2580B	277865
LCS 180-278506/1	Lab Control Sample	Total/NA	Solid	SM 2580B	
180-89564-4 DU	TO-ISS-AK-01 T04	Leach	Solid	SM 2580B	277865

Analysis Batch: 278507

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-4	TO-ISS-AK-01 T04	Leach	Solid	SM 2510B	277865
180-89564-13	TO-ISS-AK-03 T04	Leach	Solid	SM 2510B	277865
180-89564-22	TO-ISS-BT-01 T04	Leach	Solid	SM 2510B	277865
180-89564-31	TO-ISS-BT-03 T04	Leach	Solid	SM 2510B	277865
180-89564-76	BLANK T04	Leach	Solid	SM 2510B	277865
MB 180-278507/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-278507/1	Lab Control Sample	Total/NA	Solid	SM 2510B	
180-89564-4 DU	TO-ISS-AK-01 T04	Leach	Solid	SM 2510B	277865

Analysis Batch: 279182

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-5	TO-ISS-AK-01 T05	Leach	Solid	EPA 9040C	277866
180-89564-14	TO-ISS-AK-03 T05	Leach	Solid	EPA 9040C	277866
180-89564-23	TO-ISS-BT-01 T05	Leach	Solid	EPA 9040C	277866
180-89564-32	TO-ISS-BT-03 T05	Leach	Solid	EPA 9040C	277866
180-89564-77	BLANK T05	Leach	Solid	EPA 9040C	277866
LCS 180-279182/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	
180-89564-5 DU	TO-ISS-AK-01 T05	Leach	Solid	EPA 9040C	277866

Analysis Batch: 279183

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-5	TO-ISS-AK-01 T05	Leach	Solid	SM 2580B	277866
180-89564-14	TO-ISS-AK-03 T05	Leach	Solid	SM 2580B	277866
180-89564-23	TO-ISS-BT-01 T05	Leach	Solid	SM 2580B	277866
180-89564-32	TO-ISS-BT-03 T05	Leach	Solid	SM 2580B	277866
180-89564-77	BLANK T05	Leach	Solid	SM 2580B	277866
LCS 180-279183/1	Lab Control Sample	Total/NA	Solid	SM 2580B	
180-89564-5 DU	TO-ISS-AK-01 T05	Leach	Solid	SM 2580B	277866

Analysis Batch: 279184

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-5	TO-ISS-AK-01 T05	Leach	Solid	SM 2510B	277866
180-89564-14	TO-ISS-AK-03 T05	Leach	Solid	SM 2510B	277866
180-89564-23	TO-ISS-BT-01 T05	Leach	Solid	SM 2510B	277866
180-89564-32	TO-ISS-BT-03 T05	Leach	Solid	SM 2510B	277866
180-89564-77	BLANK T05	Leach	Solid	SM 2510B	277866
MB 180-279184/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-279184/1	Lab Control Sample	Total/NA	Solid	SM 2510B	
180-89564-5 DU	TO-ISS-AK-01 T05	Leach	Solid	SM 2510B	277866

Analysis Batch: 280486

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-6	TO-ISS-AK-01 T06	Leach	Solid	EPA 9040C	277868
180-89564-15	TO-ISS-AK-03 T06	Leach	Solid	EPA 9040C	277868

General Chemistry (Continued)

Analysis Batch: 280486 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-24	TO-ISS-BT-01 T06	Leach	Solid	EPA 9040C	277868
180-89564-33	TO-ISS-BT-03 T06	Leach	Solid	EPA 9040C	277868
180-89564-78	BLANK T06	Leach	Solid	EPA 9040C	277868
LCS 180-280486/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	
180-89564-6 DU	TO-ISS-AK-01 T06	Leach	Solid	EPA 9040C	277868

Analysis Batch: 280487

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-6	TO-ISS-AK-01 T06	Leach	Solid	SM 2580B	277868
180-89564-15	TO-ISS-AK-03 T06	Leach	Solid	SM 2580B	277868
180-89564-24	TO-ISS-BT-01 T06	Leach	Solid	SM 2580B	277868
180-89564-33	TO-ISS-BT-03 T06	Leach	Solid	SM 2580B	277868
180-89564-78	BLANK T06	Leach	Solid	SM 2580B	277868
LCS 180-280487/1	Lab Control Sample	Total/NA	Solid	SM 2580B	
180-89564-6 DU	TO-ISS-AK-01 T06	Leach	Solid	SM 2580B	277868

Analysis Batch: 280488

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-6	TO-ISS-AK-01 T06	Leach	Solid	SM 2510B	277868
180-89564-15	TO-ISS-AK-03 T06	Leach	Solid	SM 2510B	277868
180-89564-24	TO-ISS-BT-01 T06	Leach	Solid	SM 2510B	277868
180-89564-33	TO-ISS-BT-03 T06	Leach	Solid	SM 2510B	277868
180-89564-78	BLANK T06	Leach	Solid	SM 2510B	277868
MB 180-280488/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-280488/1	Lab Control Sample	Total/NA	Solid	SM 2510B	
180-89564-6 DU	TO-ISS-AK-01 T06	Leach	Solid	SM 2510B	277868

Analysis Batch: 281963

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-7	TO-ISS-AK-01 T07	Leach	Solid	EPA 9040C	277869
180-89564-16	TO-ISS-AK-03 T07	Leach	Solid	EPA 9040C	277869
180-89564-25	TO-ISS-BT-01 T07	Leach	Solid	EPA 9040C	277869
180-89564-34	TO-ISS-BT-03 T07	Leach	Solid	EPA 9040C	277869
180-89564-79	BLANK T07	Leach	Solid	EPA 9040C	277869
LCS 180-281963/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	
180-89564-7 DU	TO-ISS-AK-01 T07	Leach	Solid	EPA 9040C	277869

Analysis Batch: 281964

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-7	TO-ISS-AK-01 T07	Leach	Solid	SM 2580B	277869
180-89564-16	TO-ISS-AK-03 T07	Leach	Solid	SM 2580B	277869
180-89564-25	TO-ISS-BT-01 T07	Leach	Solid	SM 2580B	277869
180-89564-34	TO-ISS-BT-03 T07	Leach	Solid	SM 2580B	277869
180-89564-79	BLANK T07	Leach	Solid	SM 2580B	277869
LCS 180-281964/1	Lab Control Sample	Total/NA	Solid	SM 2580B	
180-89564-7 DU	TO-ISS-AK-01 T07	Leach	Solid	SM 2580B	277869

Analysis Batch: 281966

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-7	TO-ISS-AK-01 T07	Leach	Solid	SM 2510B	277869
180-89564-16	TO-ISS-AK-03 T07	Leach	Solid	SM 2510B	277869

General Chemistry (Continued)

Analysis Batch: 281966 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-25	TO-ISS-BT-01 T07	Leach	Solid	SM 2510B	277869
180-89564-34	TO-ISS-BT-03 T07	Leach	Solid	SM 2510B	277869
180-89564-79	BLANK T07	Leach	Solid	SM 2510B	277869
MB 180-281966/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-281966/1	Lab Control Sample	Total/NA	Solid	SM 2510B	
180-89564-7 DU	TO-ISS-AK-01 T07	Leach	Solid	SM 2510B	277869

Analysis Batch: 282773

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-8	TO-ISS-AK-01 T08	Leach	Solid	EPA 9040C	277871
180-89564-17	TO-ISS-AK-03 T08	Leach	Solid	EPA 9040C	277871
180-89564-26	TO-ISS-BT-01 T08	Leach	Solid	EPA 9040C	277871
180-89564-35	TO-ISS-BT-03 T08	Leach	Solid	EPA 9040C	277871
180-89564-80	BLANK T08	Leach	Solid	EPA 9040C	277871
LCS 180-282773/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	
180-89564-8 DU	TO-ISS-AK-01 T08	Leach	Solid	EPA 9040C	277871

Analysis Batch: 282774

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-8	TO-ISS-AK-01 T08	Leach	Solid	SM 2580B	277871
180-89564-17	TO-ISS-AK-03 T08	Leach	Solid	SM 2580B	277871
180-89564-26	TO-ISS-BT-01 T08	Leach	Solid	SM 2580B	277871
180-89564-35	TO-ISS-BT-03 T08	Leach	Solid	SM 2580B	277871
180-89564-80	BLANK T08	Leach	Solid	SM 2580B	277871
LCS 180-282774/1	Lab Control Sample	Total/NA	Solid	SM 2580B	
180-89564-8 DU	TO-ISS-AK-01 T08	Leach	Solid	SM 2580B	277871

Analysis Batch: 282776

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-8	TO-ISS-AK-01 T08	Leach	Solid	SM 2510B	277871
180-89564-17	TO-ISS-AK-03 T08	Leach	Solid	SM 2510B	277871
180-89564-26	TO-ISS-BT-01 T08	Leach	Solid	SM 2510B	277871
180-89564-35	TO-ISS-BT-03 T08	Leach	Solid	SM 2510B	277871
180-89564-80	BLANK T08	Leach	Solid	SM 2510B	277871
MB 180-282776/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-282776/1	Lab Control Sample	Total/NA	Solid	SM 2510B	
180-89564-8 DU	TO-ISS-AK-01 T08	Leach	Solid	SM 2510B	277871

Analysis Batch: 284773

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-9	TO-ISS-AK-01 T09	Leach	Solid	EPA 9040C	277872
180-89564-18	TO-ISS-AK-03 T09	Leach	Solid	EPA 9040C	277872
180-89564-27	TO-ISS-BT-01 T09	Leach	Solid	EPA 9040C	277872
180-89564-36	TO-ISS-BT-03 T09	Leach	Solid	EPA 9040C	277872
180-89564-81	BLANK T09	Leach	Solid	EPA 9040C	277872
LCS 180-284773/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	
180-89564-9 DU	TO-ISS-AK-01 T09	Leach	Solid	EPA 9040C	277872

Analysis Batch: 284783

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-9	TO-ISS-AK-01 T09	Leach	Solid	SM 2580B	277872

General Chemistry (Continued)

Analysis Batch: 284783 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-18	TO-ISS-AK-03 T09	Leach	Solid	SM 2580B	277872
180-89564-27	TO-ISS-BT-01 T09	Leach	Solid	SM 2580B	277872
180-89564-36	TO-ISS-BT-03 T09	Leach	Solid	SM 2580B	277872
180-89564-81	BLANK T09	Leach	Solid	SM 2580B	277872
LCS 180-284783/1	Lab Control Sample	Total/NA	Solid	SM 2580B	
180-89564-9 DU	TO-ISS-AK-01 T09	Leach	Solid	SM 2580B	277872

Analysis Batch: 284784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-89564-9	TO-ISS-AK-01 T09	Leach	Solid	SM 2510B	277872
180-89564-18	TO-ISS-AK-03 T09	Leach	Solid	SM 2510B	277872
180-89564-27	TO-ISS-BT-01 T09	Leach	Solid	SM 2510B	277872
180-89564-36	TO-ISS-BT-03 T09	Leach	Solid	SM 2510B	277872
180-89564-81	BLANK T09	Leach	Solid	SM 2510B	277872
MB 180-284784/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-284784/1	Lab Control Sample	Total/NA	Solid	SM 2510B	
180-89564-9 DU	TO-ISS-AK-01 T09	Leach	Solid	SM 2510B	277872

TestAmerica Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238-2907
phone 412.963.7058 fax 412.963.2468

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Chris Robb	Site Contact: Jule Carr	Date:	COC No:
Geosyntec Consultants	Tel/Fax:	Lab Contact: Carrie Gamber	Carrier:	_____ of _____ COCs
10600 N Port Washington Rd #100	Analysis Turnaround Time			Sampler:
Mequon, WI 53092	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
262-834-0232	TAT if different from Below _____			Walk-in Client:
	☑ 2 weeks			Lab Sampling:
Project Name: Time Oil	☐ 1 week			
Site: Time Oil, Seattle	☐ 2 days			Job / SDG No.:
P O # CHE8384	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	8260C (5035) BTEX, Cis 1,2-DCE, TCE	8015D (5035) GRO	8015D (3540C) DRO/ORO	2540G Moisture	1316 - See Notes	1315 - See Notes	Sample Specific Notes:
														TEST ID#
TO-ISS-AK-01			C	S	2								X	30168-1-1-9/10
TO-ISS-AK-03			C	S	2								X	30168-3-1-9/10
TO-ISS-BT-01			C	S	2								X	30170-1-1-9/10
TO-ISS-BT-03			C	S	2								X	30170-3-1-9/10

180-89564 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: 1315 analysis to include BTEX, cis-1,2-DCE, TCE, GRO/DRO/ORO analyses

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: _____ Corr'd: _____		Therm ID No.: _____
Relinquished by:	Company: TEST	Date/Time: 4/26/19 15	Received by:	Company: DAIPR	Date/Time: 4/30/19 1540
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.17, dated 4/27/2018

00200

FedEx Express Package US Airbill

FedEx Tracking Number 8146 7597 9126

Form ID No. 0215

Recipient's Copy

1 From

Date 4/26/19

Sender's Name Lee Bucks Phone 770 938-8233

Company T. E. S. T LLC

Address 1874 FORGE ST

Dept./Floor/Suite/Room

City TUCKER State GA ZIP 30084-6828

2 Your Internal Billing Reference

3 To

Recipient's Name Receiving Dept Phone 4[illegible]

Company Test America

Address 301 Alpha Drive

Dept./Floor/Suite/Room

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Address

Use this line for the HOLD location address or for continuation of your shipping address.

Hold Weekday — FedEx location address REQUIRED. NOT available for FedEx First Overnight.

Hold Saturday — FedEx location address REQUIRED. Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Uncorrected temp 19.9 °C

Thermometer ID 10

ZIP [illegible]

0132941330

CF 0 Initials TB

PT-WI-SR-001 effective 11/8/18

8146 7597 9126

4 Express Package Service * To most locations.

Packages up to 150 lbs. For packages over 150 lbs., use the FedEx Express Freight US Airbill.

Next Business Day

- ☐ FedEx First Overnight — Earliest next business morning delivery to select locations. Friday shipments will be delivered on Monday unless Saturday Delivery is selected.
- ☐ FedEx Priority Overnight — Next business morning.* Friday shipments will be delivered on Monday unless Saturday Delivery is selected.
- ☐ FedEx Standard Overnight — Next business afternoon.* Saturday Delivery NOT available.

2 or 3 Business Days

- ☐ FedEx 2Day A.M. — Second business morning.* Saturday Delivery NOT available.
- ☑ FedEx 2Day — Second business afternoon.* Thursday shipments will be delivered on Monday unless Saturday Delivery is selected
- ☐ FedEx Express Saver — Third business day.* Saturday Delivery NOT available.

5 Packaging * Declared value limit $500.

☐ FedEx Envelope* ☐ FedEx Pak* ☑ FedEx Box ☐ FedEx Tube ☐ Other

6 Special Handling and Delivery Signature Options Fees may apply. See the FedEx Service Guide.

☐ Saturday Delivery — NOT available for FedEx Standard Overnight, FedEx 2Day A.M., or FedEx Express Saver.

☐ No Signature Required — Package may be left without obtaining a signature for delivery.

☐ Direct Signature — Someone at recipient's address may sign for delivery.

☐ Indirect Signature — If no one is available at recipient's address, someone at a neighboring address may sign for delivery. For residential deliveries only.

Does this shipment contain dangerous goods?

One box must be checked.

☑ No ☐ Yes — As per attached Shipper's Declaration. ☐ Yes — Shipper's Declaration not required. ☐ Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg

Restrictions apply for dangerous goods — see the current FedEx Service Guide. ☐ Cargo Aircraft Only

7 Payment *Bill to:*

Enter FedEx Acct. No. or Credit Card No. below. Obtain recip. Acct. No.

☑ Sender Acct. No. in Section 1 will be billed. ☐ Recipient ☐ Third Party ☐ Credit Card ☐ Cash/C

Total Packages 1 Total Weight 2 lbs. Credit Card Auth.

†Our liability is limited to US$100 unless you declare a higher value. See the current FedEx Service Guide for details.

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180-89584 Waybill

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7/26/2019

12/1.0

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone (412) 963-7058 Fax (412) 963-2468

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Gamber, Carrie L	Carrier Tracking No(s):	COC No: 180-362067.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: carrie.gamber@testamericainc.com	State of Origin: Washington	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Washington		Job #: 180-89564-1
Address: 4101 Shuffel Street NW,	Due Date Requested: 5/13/2019			
City: North Canton	TAT Requested (days):			
State, Zip: OH, 44720				
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:			
Email:	WO #:			
Project Name: Time Oil CHE8384	Project #: 18020185			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

C219 GC

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015D_DRO/3520C_LVI DRO/ORO LVI 1315	8015D_GRO/5030C GRO 1315	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
TO-ISS-AK-01 T01 (180-89564-37)	5/6/19	05:00 Pacific		Water			X	X	4	
TO-ISS-AK-03 T01 (180-89564-46)	5/6/19	05:05 Pacific		Water			X	X	4	
TO-ISS-BT-01 T01 (180-89564-55)	5/6/19	05:10 Pacific		Water			X	X	4	
TO-ISS-BT-03 T01 (180-89564-64)	5/6/19	05:15 Pacific		Water			X	X	4	
BLANK T01 (180-89564-82)	5/6/19	05:15 Pacific		Water			X	X	4	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification: Unconfirmed	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☐ Disposal By Lab ☐ Archive For Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	5/6/19 1700	TA PHX		5-7-19 925	TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

TestAmerica Canton Sample Receipt Form/Narrative **Login # :** _____
Canton Facility

Client Pitt Site Name _____ Cooler unpacked by:

Cooler Received on 5-7-19 Opened on 5-8-19

FedEx: 1st Grd (Exp) UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # _____ Foam Box (Client Cooler) Box Other _____

Packing material used: (Bubble Wrap) Foam Plastic Bag None Other _____

COOLANT: (Wet Ice) Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form
   IR GUN# IR-8 (CF **-0.2** °C) Observed Cooler Temp. 1.2 °C Corrected Cooler Temp. 1.0 °C
   IR GUN #36 (CF **+0.7**°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1	(Yes)	No
-Were the seals on the outside of the cooler(s) signed & dated?	(Yes)	No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes	(No)
-Were tamper/custody seals intact and uncompromised?	(Yes)	No NA
3. Shippers' packing slip attached to the cooler(s)?	(Yes)	No
4. Did custody papers accompany the sample(s)?	(Yes)	No
5. Were the custody papers relinquished & signed in the appropriate place?	(Yes)	No
6. Was/were the person(s) who collected the samples clearly identified on the COC?	Yes	(No)
7. Did all bottles arrive in good condition (Unbroken)?	(Yes)	No
8. Could all bottle labels be reconciled with the COC?	(Yes)	No
9. Were correct bottle(s) used for the test(s) indicated?	(Yes)	No
10. Sufficient quantity received to perform indicated analyses?	(Yes)	No
11. Are these work share samples?	(Yes)	No
If yes, Questions 12-16 have been checked at the originating laboratory.		
12. Were all preserved sample(s) at the correct pH upon receipt?	Yes	No NA pH Strip Lot# **HC984738**
13. Were VOAs on the COC?	Yes	(No)
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this.	Yes	No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____	Yes	No
16. Was a LL Hg or Me Hg trip blank present? _____	Yes	No

Tests that are not checked for pH by Receiving:

VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by:

_____

_____

_____

_____

_____

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.

Sample(s) _____ were received in a broken container.

Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.

Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

1.4|1.2

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone (412) 963-7058 Fax (412) 963-2468

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Gamber, Carrie L	Carrier Tracking No(s):	COC No: 180-362180.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: carrie.gamber@testamericainc.com	State of Origin: Washington	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Washington		Job #: 180-89564-1
Address: 4101 Shuffel Street NW,	Due Date Requested: 5/13/2019			
City: North Canton	TAT Requested (days):			
State, Zip: OH, 44720				
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:			
Email:	WO #:			
Project Name: Time Oil CHE8384	Project #: 18020185			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

GC, CD25

Special Instructions/Note:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015D_DRO/3520C_LVI DRO/ORO LVI 1315	8015D_GRO/5030C GRO 1315	Total Number of containers
			Preservation Code:						
TO-ISS-AK-01 T02 (180-89564-38)	5/7/19	05:00 Pacific		Water			X	X	4
TO-ISS-AK-03 T02 (180-89564-47)	5/7/19	05:05 Pacific		Water			X	X	4
TO-ISS-BT-01 T02 (180-89564-56)	5/7/19	05:10 Pacific		Water			X	X	4
TO-ISS-BT-03 T02 (180-89564-65)	5/7/19	05:15 Pacific		Water			X	X	4
BLANK T02 (180-89564-83)	5/7/19	05:15 Pacific		Water			X	X	4

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification Unconfirmed	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)* ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		5/7/19 1700			5/8/19 920	
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

7/26/2019

TestAmerica Canton Sample Receipt Form/Narrative **Login # :** _____
Canton Facility

Client TA PITT Site Name _____ Cooler unpacked by:

Cooler Received on 5/8/19 Opened on 5/8/19

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # TA Foam Box Client Cooler Box Other _____

Packing material used: Bubble Wrap Foam Plastic Bag None Other _____

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form
   IR GUN# IR-8 (CF **-0.2** °C) Observed Cooler Temp. 1.4 °C Corrected Cooler Temp. 1.2 °C
   IR GUN #36 (CF **+0.7**°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1 Yes No
   -Were the seals on the outside of the cooler(s) signed & dated? Yes No NA
   -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
   -Were tamper/custody seals intact and uncompromised? Yes No NA
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels be reconciled with the COC? Yes No
9. Were correct bottle(s) used for the test(s) indicated? Yes No
10. Sufficient quantity received to perform indicated analyses? Yes No
11. Are these work share samples? Yes No
    If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# **HC984738**
13. Were VOAs on the COC? Yes No
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____ Yes No
16. Was a LL Hg or Me Hg trip blank present? _____ Yes No

Tests that are not checked for pH by Receiving:

VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES

Samples processed by:

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

WI-NC-099

1.0/C0.8
1.2/C1.0
4.2/C4.0

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone (412) 963-7058 Fax (412) 963-2468

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Gamber, Carrie L	Carrier Tracking No(s):	COC No: 180-362296.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: carrie.gamber@testamericainc.com	State of Origin: Washington	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Washington		Job #: 180-89564-1
Address: 4101 Shuffel Street NW,	Due Date Requested: 5/13/2019			
City: North Canton	TAT Requested (days):			
State, Zip: OH, 44720				
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:			
Email:	WO #:			
Project Name: Time Oil CHE8384	Project #: 18020185			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

C201+GL

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015D_DRO/3520C_LVI DRO/ORO LVI 1315	8015D_GRO/5030C GRO 1315	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
TO-ISS-AK-01 T03 (180-89564-39)	5/8/19	05:00 Pacific		Water			X	X	4	
TO-ISS-AK-03 T03 (180-89564-48)	5/8/19	05:05 Pacific		Water			X	X	4	
TO-ISS-BT-01 T03 (180-89564-57)	5/8/19	05:10 Pacific		Water			X	X	4	
TO-ISS-BT-03 T03 (180-89564-66)	5/8/19	05:15 Pacific		Water			X	X	4	
BLANK T03 (180-89564-84)	5/8/19	05:15 Pacific		Water			X	X	4	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	5/8/19 1700			5-9-19 940	ETA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

TestAmerica Canton Sample Receipt Form/Narrative **Login # :** _____
Canton Facility

Client ETA Site Name _____ Cooler unpacked by: Ryan Cribley

Cooler Received on 5-9-19 Opened on 5-9-19 940

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # TA Foam Box Client Cooler Box Other _____

Packing material used: Bubble Wrap Foam Plastic Bag None Other _____

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☒ See Multiple Cooler Form
   IR GUN# IR-8 (CF -0.2 °C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
   IR GUN #36 (CF +0.7°C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 3 Yes No
   -Were the seals on the outside of the cooler(s) signed & dated? N/A Yes No NA
   -Were tamper/custody seals on the bottle(s) or bottle kits (LL Hg/MeHg)? Yes No
   -Were tamper/custody seals intact and uncompromised? Yes No NA
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels be reconciled with the COC? Yes No
9. Were correct bottle(s) used for the test(s) indicated? Yes No
10. Sufficient quantity received to perform indicated analyses? Yes No
11. Are these work share samples? Yes No
    If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# **HC984738**
13. Were VOAs on the COC? Yes No
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____ Yes No
16. Was a LL Hg or Me Hg trip blank present? _____ Yes No

Tests that are not checked for pH by Receiving:
VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by: Ryan C

~~Did not receive any GRO's~~ RAC 5-9-19

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

Login # : ______________

TestAmerica Canton Sample Receipt Multiple Cooler Form

Cooler Description (Circle)	IR Gun # (Circle)	Observed Temp °C	Corrected Temp °C	Coolant (Circle)
TA Client Box Other	IR-8 #36	1.0	0.8	Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36	1.2	1.0	Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36	4.2	4.0	Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
				☐ See Temperature Excursion Form

WI-NC-099 Cooler Receipt Form Page 2 – Multiple Coolers

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone (412) 963-7058 Fax (412) 963-2468

1.8/1.6 2.4/2.2 3.0/2.8

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Gamber, Carrie L	Carrier Tracking No(s):	COC No: 180-362793.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: carrie.gamber@testamericainc.com	State of Origin: Washington	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Washington		Job #: 180-89564-1
Address: 4101 Shuffel Street NW,	Due Date Requested: 5/20/2019			
City: North Canton	TAT Requested (days):			
State, Zip: OH, 44720				
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:			
Email:	WO #:			
Project Name: Time Oil CHE8384	Project #: 18020185			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

W19 + C206

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015D_DRO/3520C_LVI DRO/ORO LVI 1315	8015D_GRO/5030C GRO 1315	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
TO-ISS-AK-01 T04 (180-89564-40)	5/13/19	05:00 Pacific		Water			X	X	4	
TO-ISS-AK-03 T04 (180-89564-49)	5/13/19	05:05 Pacific		Water			X	X	4	
TO-ISS-BT-01 T04 (180-89564-58)	5/13/19	05:10 Pacific		Water			X	X	4	
TO-ISS-BT-03 T04 (180-89564-67)	5/13/19	05:15 Pacific		Water			X	X	4	
BLANK T04 (180-89564-85)	5/13/19	05:15 Pacific		Water			X	X	4	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification: Unconfirmed	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:
Empty Kit Relinquished by: Date: Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	5/13/19 1700			5-14-19 940	ETA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

TestAmerica Canton Sample Receipt Form/Narrative **Login # :** _____
Canton Facility

Client ETA Site Name _____ Cooler unpacked by: Ryan Cribley

Cooler Received on 5-14-19 Opened on 5-14-19 940

FedEx: 1st Grd (Exp) UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # TA Foam Box Client Cooler Box Other _____

Packing material used: (Bubble Wrap) Foam (Plastic Bag) None Other _____

COOLANT: (Wet Ice) Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☑ See Multiple Cooler Form
   IR GUN# IR-8 (CF **-0.2** °C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
   IR GUN #36 (CF **+0.7**°C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 6	(Yes)	No
-Were the seals on the outside of the cooler(s) signed & dated? total	(Yes)	No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes	(No)
-Were tamper/custody seals intact and uncompromised?	(Yes)	No NA
3. Shippers' packing slip attached to the cooler(s)?	(Yes)	No
4. Did custody papers accompany the sample(s)?	(Yes)	No
5. Were the custody papers relinquished & signed in the appropriate place?	(Yes)	No
6. Was/were the person(s) who collected the samples clearly identified on the COC?	Yes	(No)
7. Did all bottles arrive in good condition (Unbroken)?	(Yes)	No
8. Could all bottle labels be reconciled with the COC?	(Yes)	No
9. Were correct bottle(s) used for the test(s) indicated?	(Yes)	No
10. Sufficient quantity received to perform indicated analyses?	(Yes)	No
11. Are these work share samples?	(Yes)	No
If yes, Questions 12-16 have been checked at the originating laboratory.		
12. Were all preserved sample(s) at the correct pH upon receipt?	Yes No	NA pH Strip Lot# **HC984738**
13. Were VOAs on the COC?	Yes	No
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this.	Yes	No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____	Yes	No
16. Was a LL Hg or Me Hg trip blank present? _____	Yes	No

Tests that are not checked for pH by Receiving:

VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by: Ryan Cribley

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

Login # : ______________

TestAmerica Canton Sample Receipt Multiple Cooler Form

Cooler Description (Circle)	IR Gun # (Circle)	Observed Temp °C	Corrected Temp °C	Coolant (Circle)
TA Client Box Other	IR-8 #36	1.8	1.6	Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36	2.4	2.2	Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36	3.0	2.8	Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
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TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
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TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None

☐ See Temperature Excursion Form

WI-NC-099 Cooler Receipt Form Page 2 – Multiple Coolers

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone: 412-963-7058 Fax: 412-963-2468

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Gamber, Carrie L	Carrier Tracking No(s):	COC No: 180-363325.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: carrie.gamber@testamericainc.com	State of Origin: Washington	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Washington		Job #: 180-89564-1
Address: 4101 Shuffel Street NW,	Due Date Requested: 5/28/2019			
City: North Canton	TAT Requested (days):			
State, Zip: OH, 44720				
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:			
Email:	WO #:			
Project Name: Time Oil CHE8384	Project #: 18020185			
Site:	SSOW#:			

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

W45, C247, GC

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015D_DRO/3520C_LVI DRO/ORO LVI 1315	8015D_GRO/5030C GRO 1315	8015D_DRO/3510C_LVI DRO/ORO LVI 1315	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
TO-ISS-AK-01 T05 (180-89564-41)	5/20/19	05:00 Pacific		Water			X	X	X	4	
TO-ISS-AK-03 T05 (180-89564-50)	5/20/19	05:05 Pacific		Water			X	X	X	4	
TO-ISS-BT-01 T05 (180-89564-59)	5/20/19	05:10 Pacific		Water			X	X	X	4	
TO-ISS-BT-03 T05 (180-89564-68)	5/20/19	05:15 Pacific		Water			X	X	X	4	
BLANK T05 (180-89564-86)	5/20/19	05:15 Pacific		Water			X	X	X	4	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	5/20/19 1700			5-21-19 930	ETA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

TestAmerica Canton Sample Receipt Form/Narrative **Login # :** _____
Canton Facility

Client ETA Site Name _____ Cooler unpacked by: Ryan Cribley

Cooler Received on 9-21-19 Opened on 9-21-19 930

FedEx: 1st Grd (Exp) UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # TA Foam Box Client Cooler Box Other _____

Packing material used: (Bubble Wrap) Foam (Plastic Bag) None Other _____

COOLANT: (Wet Ice) Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form
   IR GUN# IR-8 (CF **-0.2** °C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
   IR GUN #36 (CF **+0.7**°C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 3	(Yes)	No
-Were the seals on the outside of the cooler(s) signed & dated? total	(Yes)	No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes	(No)
-Were tamper/custody seals intact and uncompromised?	(Yes)	No NA
3. Shippers' packing slip attached to the cooler(s)?	(Yes)	No
4. Did custody papers accompany the sample(s)?	(Yes)	No
5. Were the custody papers relinquished & signed in the appropriate place?	(Yes)	No
6. Was/were the person(s) who collected the samples clearly identified on the COC?	Yes	(No)
7. Did all bottles arrive in good condition (Unbroken)?	(Yes)	No
8. Could all bottle labels be reconciled with the COC?	(Yes)	No
9. Were correct bottle(s) used for the test(s) indicated?	(Yes)	No
10. Sufficient quantity received to perform indicated analyses?	(Yes)	No
11. Are these work share samples?	(Yes)	No
If yes, Questions 12-16 have been checked at the originating laboratory.		
12. Were all preserved sample(s) at the correct pH upon receipt?	Yes	No NA
13. Were VOAs on the COC?	Yes	No
14. Were air bubbles >6 mm in any VOA vials? ● ← Larger than this.	Yes	No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____	Yes	No
16. Was a LL Hg or Me Hg trip blank present? _____	Yes	No

pH Strip Lot# **HC984738**

Tests that are not checked for pH by Receiving:
VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by: Ryan Cribley

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s):_____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

Login # : ______________

TestAmerica Canton Sample Receipt Multiple Cooler Form

Cooler Description (Circle)	IR Gun # (Circle)	Observed Temp °C	Corrected Temp °C	Coolant (Circle)
TA Client Box Other	IR-8 #36	2.4	2.2	Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36	2.2	2.0	Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36	3.4	3.2	Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
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TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
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TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
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TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None

☐ See Temperature Excursion Form

WI-NC-099 Cooler Receipt Form Page 2 – Multiple Coolers

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone: 412-963-7058 Fax: 412-963-2468

3.8/3.9
3.0/3.1

Chain of Custody Record

eurofins Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Gamber, Carrie L	Carrier Tracking No(s):	COC No: 180-364664.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: carrie.gamber@testamericainc.com	State of Origin: Washington	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Washington		Job #: 180-89564-1
Address: 4101 Shuffel Street NW,	Due Date Requested: 6/10/2019			
City: North Canton	TAT Requested (days):			
State, Zip: OH, 44720				
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:			
Email:	WO #:			
Project Name: Time Oil CHE8384	Project #: 18020185			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

GC, COC

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015D_DRO/3520C_LVI DRO/ORO LVI 1315	8015D_GRO/5030C GRO 1315	8015D_DRO/3510C_LVI DRO/ORO LVI 1315	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
TO-ISS-AK-01 T06 (180-89564-42)	6/3/19	05:00 Pacific		Water			X	X	X	4	
TO-ISS-AK-03 T06 (180-89564-51)	6/3/19	05:05 Pacific		Water			X	X	X	4	
TO-ISS-BT-01 T06 (180-89564-60)	6/3/19	05:10 Pacific		Water			X	X	X	4	
TO-ISS-BT-03 T06 (180-89564-69)	6/3/19	05:15 Pacific		Water			X	X	X	4	
BLANK T06 (180-89564-87)	6/3/19	05:15 Pacific		Water			X	X	X	4	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by:	Date/Time: 6/3/19 1700	Company: DRPST	Received by:	Date/Time: 6/4/19 930	Company: TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Eurofins TestAmerica Canton Sample Receipt Form/Narrative **Login # :** _____
Canton Facility

Client TA PITT Site Name _____ Cooler unpacked by:

Cooler Received on 6/4/19 Opened on 6/4/19

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time Storage Location

TestAmerica Cooler # TA Foam Box Client Cooler Box Other _____

Packing material used: Bubble Wrap Foam Plastic Bag None Other _____

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☒ See Multiple Cooler Form
   IR GUN# IR-8 (CF **+0.1** °C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
   IR GUN #36 (CF **+0.6**°C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1 Yes No
   -Were the seals on the outside of the cooler(s) signed & dated? Yes No NA
   -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
   -Were tamper/custody seals intact and uncompromised? Yes No NA
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels be reconciled with the COC? Yes No
9. Were correct bottle(s) used for the test(s) indicated? Yes No
10. Sufficient quantity received to perform indicated analyses? Yes No
11. Are these work share samples? Yes No
    If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC984738
13. Were VOAs on the COC? Yes No
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____ Yes No
16. Was a LL Hg or Me Hg trip blank present? _____ Yes No

Tests that are not checked for pH by Receiving:

VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by:

_____

_____

_____

_____

_____

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s):_____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

WI-NC-099

Login # : ______________

TestAmerica Canton Sample Receipt Multiple Cooler Form				
Cooler Description (Circle)	IR Gun # (Circle)	Observed Temp °C	Corrected Temp °C	Coolant (Circle)
TA Client Box Other	**IR-8** #36	3.8	3.9	**Wet Ice** Blue Ice Dry Ice Water None
TA Client Box Other	**IR-8** #36	3.0	3.1	**Wet Ice** Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
			☐ See Temperature Excursion Form	

WI-NC-099 Cooler Receipt Form Page 2 – Multiple Coolers

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone: 412-963-7058 Fax: 412-963-2468

Chain of Custody Record

eurofins Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Gamber, Carrie L	Carrier Tracking No(s):	COC No: 180-365984.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: carrie.gamber@testamericainc.com	State of Origin: Washington	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Washington		Job #: 180-89564-1
Address: 4101 Shuffel Street NW,	Due Date Requested: 6/24/2019			
City: North Canton	TAT Requested (days):			
State, Zip: OH, 44720				
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:			
Email:	WO #:			
Project Name: Time Oil CHE8384	Project #: 18020185			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

C10C GC

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015D_DRO/3520C_LVI DRO/ORO LVI 1315	8015D_GRO/5030C GRO 1315	8015D_DRO/3510C_LVI DRO/ORO LVI 1315	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
TO-ISS-AK-01 T07 (180-89564-43)	6/17/19	05:00 Pacific		Water			X	X	X	4	
TO-ISS-AK-03 T07 (180-89564-52)	6/17/19	05:05 Pacific		Water			X	X	X	4	
TO-ISS-BT-01 T07 (180-89564-61)	6/17/19	05:10 Pacific		Water			X	X	X	4	
TO-ISS-BT-03 T07 (180-89564-70)	6/17/19	05:15 Pacific		Water			X	X	X	4	
BLANK T07 (180-89564-88)	6/17/19	05:15 Pacific		Water			X	X	X	4	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/17/19 1700	TA PGT		6-18-19 950	TAC
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Eurofins TestAmerica Canton Sample Receipt Form/Narrative Login # :_____
Canton Facility

Client ETA Pittsburg Site Name_____ Cooler unpacked by:
Cooler Received on 6-18-19 Opened on 6-18-19
FedEx: 1st Grd (Exp) UPS FAS Clipper Client Drop Off TestAmerica Courier Other
Receipt After-hours: Drop-off Date/Time Storage Location

TestAmerica Cooler # 14 Foam Box Client Cooler Box Other _____
Packing material used: Bubble Wrap Foam Plastic Bag None Other _____
COOLANT: (Wet Ice) Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☑ See Multiple Cooler Form
   IR GUN# IR-8 (CF +0.1 °C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
   IR GUN #36 (CF +0.6°C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1 (Yes) No
   -Were the seals on the outside of the cooler(s) signed & dated? (Yes) No NA
   -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes (No)
   -Were tamper/custody seals intact and uncompromised? (Yes) No NA
3. Shippers' packing slip attached to the cooler(s)? (Yes) No
4. Did custody papers accompany the sample(s)? (Yes) No
5. Were the custody papers relinquished & signed in the appropriate place? (Yes) No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes (No)
7. Did all bottles arrive in good condition (Unbroken)? (Yes) No
8. Could all bottle labels be reconciled with the COC? (Yes) No
9. Were correct bottle(s) used for the test(s) indicated? (Yes) No
10. Sufficient quantity received to perform indicated analyses? (Yes) No
11. Are these work share samples? (Yes) No
    If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC984738
13. Were VOAs on the COC? Yes No
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____ Yes No
16. Was a LL Hg or Me Hg trip blank present? _____ Yes No

Tests that are not checked for pH by Receiving:
VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by:

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s):_____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

WI-NC-099

TestAmerica Canton Sample Receipt Multiple Cooler Form

Cooler Description (Circle)	IR Gun # (Circle)	Observed Temp °C	Corrected Temp °C	Coolant (Circle)
(TA) Client Box Other	(IR-8) #36	1.2	1.3	(Wet Ice) Blue Ice Dry Ice Water None
(TA) Client Box Other	(IR-8) #36	1.6	1.7	(Wet Ice) Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
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TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
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TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None

☐ See Temperature Excursion Form

WI-NC-099 Cooler Receipt Form Page 2 Multiple Coolers

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone: 412-963-7058 Fax: 412-963-2468

1.0/1.1 2.2/2.3 2.0/2.1

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Gamber, Carrie L	Carrier Tracking Nos(s):	COC No: 180-366762.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: carrie.gamber@testamericainc.com	State of Origin: Washington	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Washington		Job #: 180-89564-1
Address: 4101 Shuffel Street NW, ,	Due Date Requested: 7/1/2019			
City: North Canton	TAT Requested (days):			
State, Zip: OH, 44720				
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:			
Email:	WO #:			
Project Name: Time Oil CHE8384	Project #: 18020185			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015D_DRO/3520C_LVI DRO/ORO LVI 1315	8015D_GRO/5030C GRO 1315	8015D_DRO/3510C_LVI DRO/ORO LVI 1315	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
TO-ISS-AK-01 T08 (180-89564-44)	6/24/19	05:00 Pacific		Water			X	X	X	4	
TO-ISS-AK-03 T08 (180-89564-53)	6/24/19	05:05 Pacific		Water			X	X	X	4	
TO-ISS-BT-01 T08 (180-89564-62)	6/24/19	05:10 Pacific		Water			X	X	X	4	
TO-ISS-BT-03 T08 (180-89564-71)	6/24/19	05:15 Pacific		Water			X	X	X	4	
BLANK T08 (180-89564-89)	6/24/19	05:15 Pacific		Water			X	X	X	4	

QC C 75'

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-24-19 1700	JA Pitt		6-25-19 930	EAE
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Eurofins TestAmerica Canton Sample Receipt Form/Narrative **Login # :** _____
Canton Facility

Client EA Pittsburg Site Name _____ Cooler unpacked by:

Cooler Received on 6-25-19 Opened on 6-25-19

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time Storage Location

TestAmerica Cooler # 14 Foam Box Client Cooler Box Other _____

Packing material used: Bubble Wrap Foam Plastic Bag None Other _____

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☑ See Multiple Cooler Form
   IR GUN# IR-8 (CF **+0.1** °C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
   IR GUN #36 (CF **+0.6**°C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity_____	Yes	No
-Were the seals on the outside of the cooler(s) signed & dated?	Yes	No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes	No
-Were tamper/custody seals intact and uncompromised?	Yes	No NA
3. Shippers' packing slip attached to the cooler(s)?	Yes	No
4. Did custody papers accompany the sample(s)?	Yes	No
5. Were the custody papers relinquished & signed in the appropriate place?	Yes	No
6. Was/were the person(s) who collected the samples clearly identified on the COC?	Yes	No
7. Did all bottles arrive in good condition (Unbroken)?	Yes	No
8. Could all bottle labels be reconciled with the COC?	Yes	No
9. Were correct bottle(s) used for the test(s) indicated?	Yes	No
10. Sufficient quantity received to perform indicated analyses?	Yes	No
11. Are these work share samples?	Yes	No
If yes, Questions 12-16 have been checked at the originating laboratory.		
12. Were all preserved sample(s) at the correct pH upon receipt?	Yes	No NA
13. Were VOAs on the COC?	Yes	No
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this.	Yes	No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____	Yes	No
16. Was a LL Hg or Me Hg trip blank present? _____	Yes	No

pH Strip Lot# **HC984738**

Tests that are not checked for pH by Receiving:

VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES

Samples processed by:

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

Login # : ______________

TestAmerica Canton Sample Receipt Multiple Cooler Form

Cooler Description (Circle)	IR Gun # (Circle)	Observed Temp °C	Corrected Temp °C	Coolant (Circle)
TA Client Box Other	IR-8 #36	1.0	1.1	Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36	2.2	2.3	Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36	2.0	2.1	Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None

☐ See Temperature Excursion Form

WI-NC-099 Cooler Receipt Form Page 2 Multiple Coolers

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone: 412-963-7058 Fax: 412-963-2468

1.8|1.9 2.0|2.1 2.4|2.5

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Gamber, Carrie L	Carrier Tracking No(s):	COC No: 180-368181.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: carrie.gamber@testamericainc.com	State of Origin: Washington	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Washington		Job #: 180-89564-1
Address: 4101 Shuffel Street NW,	Due Date Requested: 7/15/2019			
City: North Canton	TAT Requested (days):			
State, Zip: OH, 44720				
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:			
Email:	WO #:			
Project Name: Time Oil CHE8384	Project #: 18020185			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

C169 GC

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015D_GRO/5030C GRO 1315	8015D_DRO/3510C_LVI DRO/ORO LVI 1315	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
TO-ISS-AK-01 T09 (180-89564-45)	7/8/19	05:00 Pacific		Water			X	X	4	
TO-ISS-AK-03 T09 (180-89564-54)	7/8/19	05:05 Pacific		Water			X	X	4	
TO-ISS-BT-01 T09 (180-89564-63)	7/8/19	05:10 Pacific		Water			X	X	4	
TO-ISS-BT-03 T09 (180-89564-72)	7/8/19	05:15 Pacific		Water			X	X	4	
BLANK T09 (180-89564-90)	7/8/19	05:15 Pacific		Water			X	X	4	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	7-8-19 1700	TA P:tt		7-9-19 940	ETA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Eurofins TestAmerica Canton Sample Receipt Form/Narrative Login # :_____
Canton Facility

Client ETA Site Name_____ Cooler unpacked by: Ryan Cribler

Cooler Received on 7-9-19 Opened on 7-9-19 940

FedEx: 1st Grd (Exp) UPS FAS Clipper Client Drop Off TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time Storage Location

TestAmerica Cooler # TA Foam Box Client Cooler Box Other

Packing material used: (Bubble Wrap) Foam (Plastic Bag) None Other

COOLANT: (Wet Ice) Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt — See Multiple Cooler Form
   IR GUN# IR-8 (CF +0.1 °C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
   IR GUN #36 (CF +0.6°C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 3 (Yes) No
   -Were the seals on the outside of the cooler(s) signed & dated? (Yes) No NA
   -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes (No)
   -Were tamper/custody seals intact and uncompromised? (Yes) No NA
3. Shippers' packing slip attached to the cooler(s)? (Yes) No
4. Did custody papers accompany the sample(s)? (Yes) No
5. Were the custody papers relinquished & signed in the appropriate place? (Yes) No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes (No)
7. Did all bottles arrive in good condition (Unbroken)? (Yes) No
8. Could all bottle labels be reconciled with the COC? (Yes) No
9. Were correct bottle(s) used for the test(s) indicated? (Yes) No
10. Sufficient quantity received to perform indicated analyses? (Yes) No
11. Are these work share samples? (Yes) No
    If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC984738
13. Were VOAs on the COC? Yes No
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____ Yes No
16. Was a LL Hg or Me Hg trip blank present? _____ Yes No

Tests that are not checked for pH by Receiving:
VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by:

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s):_____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

WI-NC-099

Login # : ______________

TestAmerica Canton Sample Receipt Multiple Cooler Form

Cooler Description (Circle)	IR Gun # (Circle)	Observed Temp °C	Corrected Temp °C	Coolant (Circle)
TA Client Box Other	IR-8 #36	1.8	1.9	Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36	2.0	2.1	Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36	2.4	2.5	Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
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TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
~~TA Client Box Other~~	~~IR-8 #36~~			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
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TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
				☐ See Temperature Excursion Form

WI-NC-099 Cooler Receipt Form Page 2 – Multiple Coolers

Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 180-89564-1

Login Number: 89564
List Number: 1
Creator: Say, Thomas C

List Source: Eurofins TestAmerica, Pittsburgh

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	COOLER TEMP WAS 19.9
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Appendix C
Post-ISS Groundwater Concentrations at Property Boundary

Table 1
GW Model
Parameter Inputs

ISS Area	Bulk Soil Concentrations (mg/kg)			Mean Observed Diffusivity (m2/sec)			ISS Surface Area in Contact with GW (m2)	ISS Surface Area in Contact with GW (m2)	Dry Density (kg/m3)	GW Flow Rate (m/yr)	Notes
	TCE	GRO-TPH	DRO-TPO	TCE	GRO-TPH	DRO-TPO					
AK-01	0.15	0.24	54	1.36E-16	3.79E-15	1.47E-12	1200	140	1,684	20	Assumes an ISS area with 383 ft exposed perimeter and 30 ft in thickness. Ignores the ISS surface in contact with ZVI trench
AK-03	0.15	0.24	54	8.44E-17	3.31E-15	1.18E-12	1200	140	1,684	20	
BT-01	0.08	720	2000	5.53E-18	6.98E-22	3.21E-15	1200	470	1,597	5	Assumes an ISS area with 426 ft exposed perimeter and 20 ft in thickness
BT-03	0.08	720	2000	5.24E-18	3.71E-22	1.11E-15	1200	470	1,597	5	

Table 2
GW Model
Post-ISS Mass Release

	ISS Area AK-01 Cumulative Release (mg/m2)			ISS Area BT-01 Cumulative Release (mg/m2)			ISS Area AK-01 Annual Release (mg/m2/yr)			ISS Area BT-01 Annual Release (mg/m2/yr)		
Time (yr)	TCE	GRO-TPH	DRO-TPH	TCE	GRO-TPH	DRO-TPH	TCE	GRO-TPH	DRO-TPH	TCE	GRO-TPH	DRO-TPH
1	0.02	0.16	699	0.00	0.19	1,146	0.019	0.16	699	0.002	0.19	1,146
2	0.03	0.22	988	0.00	0.27	1,621	0.008	0.065	289	0.001	0.080	475
3	0.03	0.27	1,210	0.00	0.33	1,985	0.006	0.050	222	0.001	0.061	364
4	0.04	0.32	1,397	0.00	0.39	2,292	0.005	0.042	187	0.001	0.052	307
5	0.04	0.35	1,562	0.00	0.43	2,563	0.004	0.037	165	0.000	0.045	271
6	0.05	0.39	1,711	0.00	0.47	2,808	0.004	0.034	149	0.000	0.041	245
7	0.05	0.42	1,848	0.01	0.51	3,033	0.004	0.031	137	0.000	0.038	225
8	0.05	0.45	1,976	0.01	0.54	3,242	0.003	0.029	128	0.000	0.035	209
9	0.06	0.47	2,096	0.01	0.58	3,439	0.003	0.027	120	0.000	0.033	197
10	0.06	0.50	2,209	0.01	0.61	3,625	0.003	0.026	113	0.000	0.031	186
11	0.06	0.52	2,317	0.01	0.64	3,802	0.003	0.024	108	0.000	0.030	177
12	0.06	0.55	2,420	0.01	0.67	3,971	0.003	0.023	103	0.000	0.028	169
13	0.07	0.57	2,519	0.01	0.69	4,133	0.003	0.022	98.8	0.000	0.027	162
14	0.07	0.59	2,614	0.01	0.72	4,289	0.003	0.021	95.1	0.000	0.026	156
15	0.07	0.61	2,706	0.01	0.75	4,439	0.002	0.021	91.8	0.000	0.025	151
16	0.07	0.63	2,795	0.01	0.77	4,585	0.002	0.020	88.7	0.000	0.024	146
17	0.08	0.65	2,881	0.01	0.79	4,726	0.002	0.019	86.0	0.000	0.024	141
18	0.08	0.67	2,964	0.01	0.82	4,863	0.002	0.019	83.5	0.000	0.023	137
19	0.08	0.69	3,045	0.01	0.84	4,996	0.002	0.018	81.2	0.000	0.022	133
20	0.08	0.71	3,124	0.01	0.86	5,126	0.002	0.018	79.1	0.000	0.022	130
21	0.09	0.72	3,202	0.01	0.88	5,253	0.002	0.017	77.2	0.000	0.021	127
22	0.09	0.74	3,277	0.01	0.90	5,376	0.002	0.017	75.3	0.000	0.021	124
23	0.09	0.76	3,351	0.01	0.92	5,497	0.002	0.017	73.6	0.000	0.020	121
24	0.09	0.77	3,423	0.01	0.94	5,615	0.002	0.016	72.1	0.000	0.020	118
25	0.09	0.79	3,493	0.01	0.96	5,731	0.002	0.016	70.6	0.000	0.019	116
26	0.10	0.80	3,562	0.01	0.98	5,845	0.002	0.016	69.2	0.000	0.019	113
27	0.10	0.82	3,630	0.01	1.0	5,956	0.002	0.015	67.9	0.000	0.019	111
28	0.10	0.83	3,697	0.01	1.0	6,065	0.002	0.015	66.6	0.000	0.018	109
29	0.10	0.85	3,762	0.01	1.0	6,173	0.002	0.015	65.4	0.000	0.018	107
30	0.10	0.86	3,827	0.01	1.1	6,278	0.002	0.015	64.3	0.000	0.018	106
31	0.10	0.88	3,890	0.01	1.1	6,382	0.002	0.014	63.3	0.000	0.017	104
32	0.11	0.89	3,952	0.01	1.1	6,484	0.002	0.014	62.2	0.000	0.017	102
33	0.11	0.91	4,013	0.01	1.1	6,585	0.002	0.014	61.3	0.000	0.017	101
34	0.11	0.92	4,074	0.01	1.1	6,684	0.002	0.014	60.4	0.000	0.017	99.0
35	0.11	0.93	4,133	0.01	1.1	6,781	0.002	0.013	59.5	0.000	0.016	97.6
36	0.11	0.95	4,192	0.01	1.2	6,877	0.002	0.013	58.6	0.000	0.016	96.2
37	0.11	0.96	4,250	0.01	1.2	6,972	0.002	0.013	57.8	0.000	0.016	94.9
38	0.12	0.97	4,307	0.01	1.2	7,066	0.002	0.013	57.0	0.000	0.016	93.6
39	0.12	0.98	4,363	0.01	1.2	7,158	0.002	0.013	56.3	0.000	0.016	92.4
40	0.12	1.00	4,419	0.01	1.2	7,249	0.001	0.013	55.6	0.000	0.015	91.2
41	0.12	1.0	4,474	0.01	1.2	7,339	0.001	0.012	54.9	0.000	0.015	90.1
42	0.12	1.0	4,528	0.01	1.2	7,428	0.001	0.012	54.2	0.000	0.015	89.0
43	0.12	1.0	4,581	0.01	1.3	7,516	0.001	0.012	53.6	0.000	0.015	87.9
44	0.12	1.0	4,634	0.01	1.3	7,603	0.001	0.012	53.0	0.000	0.015	86.9
45	0.13	1.1	4,687	0.01	1.3	7,689	0.001	0.012	52.4	0.000	0.014	85.9
46	0.13	1.1	4,738	0.01	1.3	7,774	0.001	0.012	51.8	0.000	0.014	85.0
47	0.13	1.1	4,790	0.01	1.3	7,858	0.001	0.012	51.2	0.000	0.014	84.0
48	0.13	1.1	4,840	0.01	1.3	7,941	0.001	0.011	50.7	0.000	0.014	83.2
49	0.13	1.1	4,891	0.01	1.3	8,024	0.001	0.011	50.2	0.000	0.014	82.3
50	0.13	1.1	4,940	0.01	1.4	8,105	0.001	0.011	49.7	0.000	0.014	81.5
51	0.13	1.1	4,989	0.01	1.4	8,186	0.001	0.011	49.2	0.000	0.014	80.6
52	0.13	1.1	5,038	0.01	1.4	8,266	0.001	0.011	48.7	0.000	0.013	79.9
53	0.14	1.1	5,086	0.01	1.4	8,345	0.001	0.011	48.2	0.000	0.013	79.1
54	0.14	1.2	5,134	0.01	1.4	8,423	0.001	0.011	47.8	0.000	0.013	78.4
55	0.14	1.2	5,181	0.01	1.4	8,501	0.001	0.011	47.3	0.000	0.013	77.6
56	0.14	1.2	5,228	0.01	1.4	8,578	0.001	0.011	46.9	0.000	0.013	76.9
57	0.14	1.2	5,275	0.01	1.5	8,654	0.001	0.010	46.5	0.000	0.013	76.2
58	0.14	1.2	5,321	0.01	1.5	8,729	0.001	0.010	46.1	0.000	0.013	75.6
59	0.14	1.2	5,366	0.01	1.5	8,804	0.001	0.010	45.7	0.000	0.013	74.9

Table 2
GW Model
Post-ISS Mass Release

	ISS Area AK-01 Cumulative Release (mg/m2)			ISS Area BT-01 Cumulative Release (mg/m2)			ISS Area AK-01 Annual Release (mg/m2/yr)			ISS Area BT-01 Annual Release (mg/m2/yr)		
Time (yr)	TCE	GRO-TPH	DRO-TPH	TCE	GRO-TPH	DRO-TPH	TCE	GRO-TPH	DRO-TPH	TCE	GRO-TPH	DRO-TPH
60	0.14	1.2	5,412	0.01	1.5	8,879	0.001	0.010	45.3	0.000	0.012	74.3
61	0.15	1.2	5,457	0.01	1.5	8,952	0.001	0.010	44.9	0.000	0.012	73.7
62	0.15	1.2	5,501	0.01	1.5	9,025	0.001	0.010	44.5	0.000	0.012	73.1
63	0.15	1.3	5,545	0.02	1.5	9,098	0.001	0.010	44.2	0.000	0.012	72.5
64	0.15	1.3	5,589	0.02	1.5	9,170	0.001	0.010	43.8	0.000	0.012	71.9
65	0.15	1.3	5,633	0.02	1.6	9,241	0.001	0.010	43.5	0.000	0.012	71.4
66	0.15	1.3	5,676	0.02	1.6	9,312	0.001	0.010	43.2	0.000	0.012	70.8
67	0.15	1.3	5,719	0.02	1.6	9,382	0.001	0.010	42.8	0.000	0.012	70.3
68	0.15	1.3	5,761	0.02	1.6	9,452	0.001	0.010	42.5	0.000	0.012	69.8
69	0.16	1.3	5,803	0.02	1.6	9,521	0.001	0.010	42.2	0.000	0.012	69.2
70	0.16	1.3	5,845	0.02	1.6	9,590	0.001	0.009	41.9	0.000	0.012	68.7
71	0.16	1.3	5,887	0.02	1.6	9,658	0.001	0.009	41.6	0.000	0.011	68.3
72	0.16	1.3	5,928	0.02	1.6	9,726	0.001	0.009	41.3	0.000	0.011	67.8
73	0.16	1.3	5,969	0.02	1.6	9,793	0.001	0.009	41.0	0.000	0.011	67.3
74	0.16	1.4	6,010	0.02	1.7	9,860	0.001	0.009	40.7	0.000	0.011	66.8
75	0.16	1.4	6,050	0.02	1.7	9,927	0.001	0.009	40.5	0.000	0.011	66.4
76	0.16	1.4	6,091	0.02	1.7	9,993	0.001	0.009	40.2	0.000	0.011	66.0
77	0.16	1.4	6,131	0.02	1.7	10,058	0.001	0.009	39.9	0.000	0.011	65.5
78	0.16	1.4	6,170	0.02	1.7	10,123	0.001	0.009	39.7	0.000	0.011	65.1
79	0.17	1.4	6,210	0.02	1.7	10,188	0.001	0.009	39.4	0.000	0.011	64.7
80	0.17	1.4	6,249	0.02	1.7	10,252	0.001	0.009	39.2	0.000	0.011	64.3
81	0.17	1.4	6,288	0.02	1.7	10,316	0.001	0.009	38.9	0.000	0.011	63.9
82	0.17	1.4	6,327	0.02	1.7	10,379	0.001	0.009	38.7	0.000	0.011	63.5
83	0.17	1.4	6,365	0.02	1.8	10,443	0.001	0.009	38.5	0.000	0.011	63.1
84	0.17	1.4	6,403	0.02	1.8	10,505	0.001	0.009	38.2	0.000	0.011	62.7
85	0.17	1.5	6,441	0.02	1.8	10,568	0.001	0.009	38.0	0.000	0.010	62.3
86	0.17	1.5	6,479	0.02	1.8	10,630	0.001	0.009	37.8	0.000	0.010	62.0
87	0.17	1.5	6,517	0.02	1.8	10,691	0.001	0.008	37.6	0.000	0.010	61.6
88	0.18	1.5	6,554	0.02	1.8	10,753	0.001	0.008	37.3	0.000	0.010	61.3
89	0.18	1.5	6,591	0.02	1.8	10,813	0.001	0.008	37.1	0.000	0.010	60.9
90	0.18	1.5	6,628	0.02	1.8	10,874	0.001	0.008	36.9	0.000	0.010	60.6
91	0.18	1.5	6,665	0.02	1.8	10,934	0.001	0.008	36.7	0.000	0.010	60.2
92	0.18	1.5	6,701	0.02	1.8	10,994	0.001	0.008	36.5	0.000	0.010	59.9
93	0.18	1.5	6,738	0.02	1.9	11,054	0.001	0.008	36.3	0.000	0.010	59.6
94	0.18	1.5	6,774	0.02	1.9	11,113	0.001	0.008	36.1	0.000	0.010	59.3
95	0.18	1.5	6,810	0.02	1.9	11,172	0.001	0.008	35.9	0.000	0.010	59.0
96	0.18	1.5	6,845	0.02	1.9	11,231	0.001	0.008	35.7	0.000	0.010	58.6
97	0.18	1.6	6,881	0.02	1.9	11,289	0.001	0.008	35.6	0.000	0.010	58.3
98	0.18	1.6	6,916	0.02	1.9	11,347	0.001	0.008	35.4	0.000	0.010	58.0
99	0.19	1.6	6,951	0.02	1.9	11,405	0.001	0.008	35.2	0.000	0.010	57.7
100	0.19	1.6	6,986	0.02	1.9	11,462	0.001	0.008	35.0	0.000	0.010	57.5

12.2.4.2 Interpretation of the cumulative release of constituents is illustrated using the analytical solution for simple radial diffusion from a cylinder into an infinite bath presented by Crank (see Ref. 6).

$$M_t = 2\rho C_o \left(\frac{D^{obs}\, t}{\pi} \right)^{1/2}$$

Where:

M_t = cumulative mass released during leaching interval i (mg/m^2)
ρ = density of the "as-tested" sample (kg/m^3)

C_o = concentration of available COPC in the solid matrix (mg/kg)
D^{obs} = observed diffusivity (m^2/s)
t = leaching time (s)

When transformed to a log-log scale, the analytical solution presented by Crank becomes linear with the square root of time.

Table 3

GW Model

Post-ISS Source Concentrations

	ISS Area AK-01 Source Concentrations (ug/L)			ISS Area BT-01 Source Concentrations (ug/L)		
Time (yr)	TCE	GRO-TPH	DRO-TPH	TCE	GRO-TPH	DRO-TPH
1	0.008	0.069	306	0.001	0.096	571
2	0.003	0.029	127	0.000	0.040	236
3	0.003	0.022	97.2	0.000	0.030	181
4	0.002	0.018	81.9	0.000	0.026	153
5	0.002	0.016	72.2	0.000	0.023	135
6	0.002	0.015	65.2	0.000	0.020	122
7	0.002	0.014	60.0	0.000	0.019	112
8	0.001	0.013	55.8	0.000	0.018	104
9	0.001	0.012	52.4	0.000	0.016	97.9
10	0.001	0.011	49.6	0.000	0.016	92.6
11	0.001	0.011	47.2	0.000	0.015	88.1
12	0.001	0.010	45.1	0.000	0.014	84.2
13	0.001	0.010	43.2	0.000	0.014	80.7
14	0.001	0.009	41.6	0.000	0.013	77.7
15	0.001	0.009	40.1	0.000	0.013	75.0
16	0.001	0.009	38.8	0.000	0.012	72.5
17	0.001	0.008	37.6	0.000	0.012	70.3
18	0.001	0.008	36.5	0.000	0.011	68.2
19	0.001	0.008	35.5	0.000	0.011	66.4
20	0.001	0.008	34.6	0.000	0.011	64.6
21	0.001	0.008	33.8	0.000	0.011	63.0
22	0.001	0.007	33.0	0.000	0.010	61.6
23	0.001	0.007	32.2	0.000	0.010	60.2
24	0.001	0.007	31.5	0.000	0.010	58.9
25	0.001	0.007	30.9	0.000	0.010	57.7
26	0.001	0.007	30.3	0.000	0.009	56.5
27	0.001	0.007	29.7	0.000	0.009	55.4
28	0.001	0.007	29.1	0.000	0.009	54.4
29	0.001	0.006	28.6	0.000	0.009	53.5
30	0.001	0.006	28.1	0.000	0.009	52.5
31	0.001	0.006	27.7	0.000	0.009	51.7
32	0.001	0.006	27.2	0.000	0.009	50.8
33	0.001	0.006	26.8	0.000	0.008	50.1
34	0.001	0.006	26.4	0.000	0.008	49.3
35	0.001	0.006	26.0	0.000	0.008	48.6
36	0.001	0.006	25.7	0.000	0.008	47.9
37	0.001	0.006	25.3	0.000	0.008	47.2
38	0.001	0.006	25.0	0.000	0.008	46.6
39	0.001	0.006	24.6	0.000	0.008	46.0
40	0.001	0.005	24.3	0.000	0.008	45.4
41	0.001	0.005	24.0	0.000	0.008	44.8
42	0.001	0.005	23.7	0.000	0.007	44.3
43	0.001	0.005	23.4	0.000	0.007	43.8
44	0.001	0.005	23.2	0.000	0.007	43.3
45	0.001	0.005	22.9	0.000	0.007	42.8
46	0.001	0.005	22.7	0.000	0.007	42.3
47	0.001	0.005	22.4	0.000	0.007	41.9
48	0.001	0.005	22.2	0.000	0.007	41.4
49	0.001	0.005	21.9	0.000	0.007	41.0
50	0.001	0.005	21.7	0.000	0.007	40.6
51	0.001	0.005	21.5	0.000	0.007	40.2
52	0.001	0.005	21.3	0.000	0.007	39.8
53	0.001	0.005	21.1	0.000	0.007	39.4
54	0.001	0.005	20.9	0.000	0.007	39.0
55	0.001	0.005	20.7	0.000	0.006	38.7
56	0.001	0.005	20.5	0.000	0.006	38.3
57	0.001	0.005	20.3	0.000	0.006	38.0
58	0.001	0.005	20.2	0.000	0.006	37.6
59	0.001	0.005	20.0	0.000	0.006	37.3
60	0.001	0.004	19.8	0.000	0.006	37.0
61	0.001	0.004	19.7	0.000	0.006	36.7
62	0.001	0.004	19.5	0.000	0.006	36.4
63	0.001	0.004	19.3	0.000	0.006	36.1
64	0.001	0.004	19.2	0.000	0.006	35.8
65	0.001	0.004	19.0	0.000	0.006	35.5
66	0.001	0.004	18.9	0.000	0.006	35.3

Table 3
GW Model
Post-ISS Source Concentrations

	ISS Area AK-01 Source Concentrations (ug/L)			ISS Area BT-01 Source Concentrations (ug/L)		
Time (yr)	TCE	GRO-TPH	DRO-TPH	TCE	GRO-TPH	DRO-TPH
67	0.001	0.004	18.7	0.000	0.006	35.0
68	0.000	0.004	18.6	0.000	0.006	34.7
69	0.000	0.004	18.5	0.000	0.006	34.5
70	0.000	0.004	18.3	0.000	0.006	34.2
71	0.000	0.004	18.2	0.000	0.006	34.0
72	0.000	0.004	18.1	0.000	0.006	33.7
73	0.000	0.004	18.0	0.000	0.006	33.5
74	0.000	0.004	17.8	0.000	0.006	33.3
75	0.000	0.004	17.7	0.000	0.006	33.1
76	0.000	0.004	17.6	0.000	0.006	32.8
77	0.000	0.004	17.5	0.000	0.005	32.6
78	0.000	0.004	17.4	0.000	0.005	32.4
79	0.000	0.004	17.3	0.000	0.005	32.2
80	0.000	0.004	17.1	0.000	0.005	32.0
81	0.000	0.004	17.0	0.000	0.005	31.8
82	0.000	0.004	16.9	0.000	0.005	31.6
83	0.000	0.004	16.8	0.000	0.005	31.4
84	0.000	0.004	16.7	0.000	0.005	31.2
85	0.000	0.004	16.6	0.000	0.005	31.0
86	0.000	0.004	16.5	0.000	0.005	30.9
87	0.000	0.004	16.4	0.000	0.005	30.7
88	0.000	0.004	16.3	0.000	0.005	30.5
89	0.000	0.004	16.2	0.000	0.005	30.3
90	0.000	0.004	16.2	0.000	0.005	30.2
91	0.000	0.004	16.1	0.000	0.005	30.0
92	0.000	0.004	16.0	0.000	0.005	29.8
93	0.000	0.004	15.9	0.000	0.005	29.7
94	0.000	0.004	15.8	0.000	0.005	29.5
95	0.000	0.004	15.7	0.000	0.005	29.4
96	0.000	0.004	15.6	0.000	0.005	29.2
97	0.000	0.004	15.6	0.000	0.005	29.1
98	0.000	0.003	15.5	0.000	0.005	28.9
99	0.000	0.003	15.4	0.000	0.005	28.8
100	0.000	0.003	15.3	0.000	0.005	28.6

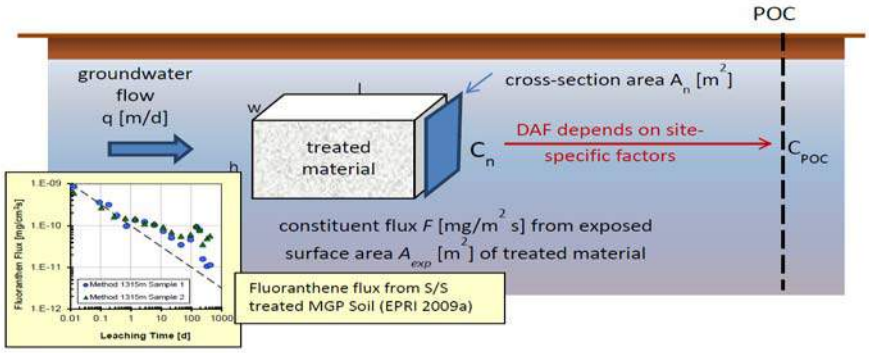

Figure 4-2. Mass flux approximation showing relationship between leaching test flux and concentrations in groundwater at the treated material and at a downgradient POC.

$$C_n = \frac{F \cdot A_{exp}}{A_n \cdot q} \qquad \text{(Eq. 1)}$$

where

C_n = concentration in the groundwater (mg/L)
F = mass flux at the surface of the treated material (mg/m^2 s) (as provided by a flux-based leaching test)
A_{exp} = exposed surface area of the treated material (m^2)
A_n = cross-sectional area of groundwater (m^2)
q = linear flow rate of the groundwater (m/d)

Table 4
GW Model
Post- ISS Receptor Concentrations
ASKO Property

Illinois EPA TACO R26 Analysis: Predicted Concentrations of COCs in Groundwater at Property Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$a_{(x)}$ = dispersivity in the x dir
$a_{(y)}$ = dispersivity in the y direction
$a_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
l = first order degradation constant (d^{-1}) no degradation was assumed

Site-Specific Parameters:

	Site-Specific Data					Calculated Site-Specific Parameters			
Distance (X) =	68	feet	=	2072.64	cm	see below	$a_{(x)}$ =	207.264	cm	IEPA Default
Hydraulic Conductivity (K) =	1.6E-03	cm/s	=	1.3E+02	cm/d		$a_{(y)}$ =	69.088	cm	IEPA Default
Hydraulic Gradient (i) =	0.04	unitless					$a_{(z)}$ =	10.3632	cm	IEPA Default
Total Soil Porosity (θ_T) =	0.25	unitless		IEPA Default			U =	21.469	cm/day	calculated
Source Width (S_w) =	50.0	feet	=	1524	cm	see below	Eq. R26 Term 1 =	5	unitless	calculated
Source Depth (S_d) =	30.0	feet	=	914.4	cm	see below	Eq. R26 Term 2 =	0	unitless	calculated
Groundwater Class =	I						Eq. R26 *erf* (Term 3) =	0.845522	unitless	calculated
							Eq. R26 *erf* (Term 4) =	0.99999	unitless	calculated

Table 4
GW Model
Post- ISS Receptor Concentrations
ASKO Property

	ISS Area AK-01 Receptor Concentrations (ug/L) Post-ISS		
	TCE	GRO-TPH	DRO-TPH
Target Concentrations (ug/L)	0.5	800	500
Time (yr)			
1	0.007	0.058	258
2	0.003	0.024	107
3	0.002	0.019	82.1
4	0.002	0.016	69.3
5	0.002	0.014	61.0
6	0.001	0.012	55.2
7	0.001	0.011	50.7
8	0.001	0.011	47.2
9	0.001	0.010	44.3
10	0.001	0.009	41.9
11	0.001	0.009	39.9
12	0.001	0.009	38.1
13	0.001	0.008	36.6
14	0.001	0.008	35.2
15	0.001	0.008	33.9
16	0.001	0.007	32.8
17	0.001	0.007	31.8
18	0.001	0.007	30.9
19	0.001	0.007	30.0
20	0.001	0.007	29.3
21	0.001	0.006	28.5
22	0.001	0.006	27.9
23	0.001	0.006	27.2
24	0.001	0.006	26.7
25	0.001	0.006	26.1
26	0.001	0.006	25.6
27	0.001	0.006	25.1
28	0.001	0.006	24.6
29	0.001	0.005	24.2
30	0.001	0.005	23.8
31	0.001	0.005	23.4
32	0.001	0.005	23.0
33	0.001	0.005	22.7
34	0.001	0.005	22.3
35	0.001	0.005	22.0
36	0.001	0.005	21.7
37	0.001	0.005	21.4
38	0.001	0.005	21.1
39	0.001	0.005	20.8
40	0.001	0.005	20.6
41	0.001	0.005	20.3
42	0.001	0.005	20.1
43	0.001	0.004	19.8
44	0.001	0.004	19.6
45	0.001	0.004	19.4
46	0.001	0.004	19.2
47	0.001	0.004	19.0
48	0.001	0.004	18.8
49	0.000	0.004	18.6
50	0.000	0.004	18.4

Exceeds target GW concentrations

	ISS Area AK-01 Receptor Concentrations (ug/L) Post-ISS and Upgradient Source		
	TCE	GRO-TPH	DRO-TPH
Target Concentrations (ug/L)	0.5	800	500
Time (yr)			
1	111	71.6	348
2	111	71.5	197
3	111	71.5	172
4	111	71.5	159
5	111	71.5	151
6	111	71.5	145
7	111	71.5	141
8	111	71.5	137
9	111	71.5	134
10	111	71.5	132
11	111	71.5	130
12	111	71.5	128
13	111	71.5	127
14	111	71.5	125
15	111	71.5	124
16	111	71.5	123
17	111	71.5	122
18	111	71.5	121
19	111	71.5	120
20	111	71.5	119
21	111	71.5	119
22	111	71.5	118
23	111	71.5	117
24	111	71.5	117
25	111	71.5	116
26	111	71.5	116
27	111	71.5	115
28	111	71.5	115
29	111	71.5	114
30	111	71.5	114
31	111	71.5	113
32	111	71.5	113
33	111	71.5	113
34	111	71.5	112
35	111	71.5	112
36	111	71.5	112
37	111	71.5	111
38	111	71.5	111
39	111	71.5	111
40	111	71.5	111
41	111	71.5	110
42	111	71.5	110
43	111	71.5	110
44	111	71.5	110
45	111	71.5	109
46	111	71.5	109
47	111	71.5	109
48	111	71.5	109
49	111	71.5	109
50	111	71.5	108

Exceeds target GW concentrations

*Note: TCE reporting limit for upgradient groundwater exceeds the target concentration.

Table 4
GW Model
Post- ISS Receptor Concentrations
ASKO Property

	ISS Area AK-01 Receptor Concentrations (ug/L) Post-ISS		
	TCE	GRO-TPH	DRO-TPH
Target Concentrations (ug/L)	0.5	800	500
Time (yr)			
51	0.000	0.004	18.2
52	0.000	0.004	18.0
53	0.000	0.004	17.8
54	0.000	0.004	17.7
55	0.000	0.004	17.5
56	0.000	0.004	17.3
57	0.000	0.004	17.2
58	0.000	0.004	17.0
59	0.000	0.004	16.9
60	0.000	0.004	16.8
61	0.000	0.004	16.6
62	0.000	0.004	16.5
63	0.000	0.004	16.3
64	0.000	0.004	16.2
65	0.000	0.004	16.1
66	0.000	0.004	16.0
67	0.000	0.004	15.8
68	0.000	0.004	15.7
69	0.000	0.004	15.6
70	0.000	0.003	15.5
71	0.000	0.003	15.4
72	0.000	0.003	15.3
73	0.000	0.003	15.2
74	0.000	0.003	15.1
75	0.000	0.003	15.0
76	0.000	0.003	14.9
77	0.000	0.003	14.8
78	0.000	0.003	14.7
79	0.000	0.003	14.6
80	0.000	0.003	14.5
81	0.000	0.003	14.4
82	0.000	0.003	14.3
83	0.000	0.003	14.2
84	0.000	0.003	14.1
85	0.000	0.003	14.1
86	0.000	0.003	14.0
87	0.000	0.003	13.9
88	0.000	0.003	13.8
89	0.000	0.003	13.7
90	0.000	0.003	13.7
91	0.000	0.003	13.6
92	0.000	0.003	13.5
93	0.000	0.003	13.4
94	0.000	0.003	13.4
95	0.000	0.003	13.3
96	0.000	0.003	13.2
97	0.000	0.003	13.2
98	0.000	0.003	13.1
99	0.000	0.003	13.0
100	0.000	0.003	13.0

Exceeds target GW concentrations

	ISS Area AK-01 Receptor Concentrations (ug/L) Post-ISS and Upgradient Source		
	TCE	GRO-TPH	DRO-TPH
Target Concentrations (ug/L)	0.5	800	500
Time (yr)			
51	111	71.5	108
52	111	71.5	108
53	111	71.5	108
54	111	71.5	108
55	111	71.5	108
56	111	71.5	107
57	111	71.5	107
58	111	71.5	107
59	111	71.5	107
60	111	71.5	107
61	111	71.5	107
62	111	71.5	106
63	111	71.5	106
64	111	71.5	106
65	111	71.5	106
66	111	71.5	106
67	111	71.5	106
68	111	71.5	106
69	111	71.5	106
70	111	71.5	106
71	111	71.5	105
72	111	71.5	105
73	111	71.5	105
74	111	71.5	105
75	111	71.5	105
76	111	71.5	105
77	111	71.5	105
78	111	71.5	105
79	111	71.5	105
80	111	71.5	104
81	111	71.5	104
82	111	71.5	104
83	111	71.5	104
84	111	71.5	104
85	111	71.5	104
86	111	71.5	104
87	111	71.5	104
88	111	71.5	104
89	111	71.5	104
90	111	71.5	104
91	111	71.5	104
92	111	71.5	104
93	111	71.5	103
94	111	71.5	103
95	111	71.5	103
96	111	71.5	103
97	111	71.5	103
98	111	71.5	103
99	111	71.5	103
100	111	71.5	103

Exceeds target GW concentrations

*Note: TCE reporting limit for upgradient groundwater exceeds the target concentration.

Table 5
GW Model
Post-ISS Receptor Concentrations
Bulk Terminal Property

Illinois EPA TACO R26 Analysis: Predicted Concentrations of COCs in Groundwater at Property Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source

C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)

X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow

$a_{(x)}$ = dispersivity in the x dir

$a_{(y)}$ = dispersivity in the y direction

$a_{(z)}$ = dispersivity in the z direction

U = Specific discharge (cm/d)

$S_{(w)}$ = horizontal source width (cm)

$S_{(d)}$ = vertical source width (cm)

I = first order degradation constant (d^{-1}) no degradation was assumed

Site-Specific Parameters:

	Site-Specific Data					Calculated Site-Specific Parameters			
Distance (X) =	51	feet	=	1554.48 cm	see below	$a_{(x)}$ =	155.448	cm	IEPA Default
Hydraulic Conductivity (K) =	2.3E-04	cm/s	=	2.0E+01 cm/d		$a_{(y)}$ =	51.816	cm	IEPA Default
Hydraulic Gradient (i) =	0.07	unitless				$a_{(z)}$ =	7.7724	cm	IEPA Default
Total Soil Porosity (θ_T)* =	0.25	unitless				U =	5.61911	cm/day	calculated
Source Width (S_w) =	254.0	feet	=	7741.92 cm	see below	Eq. R26 Term 1 =	5	unitless	calculated
Source Depth (S_d) =	20.0	feet	=	609.6 cm	see below	Eq. R26 Term 2 =	0	unitless	calculated
Groundwater Class =	I					Eq. R26 *erf* (Term 3) =	1	unitless	calculated
						Eq. R26 *erf* (Term 4) =	0.999912	unitless	calculated

Table 5
GW Model
Post-ISS Receptor Concentrations
Bulk Terminal Property

	ISS Area BT-01 Receptor Concentrations (ug/L) Post-ISS		
	TCE	GRO-TPH	DRO-TPH
Target Concentrations (ug/L)	0.5	800	500
Time (yr)			
1	0.001	0.096	571
2	0.000	0.040	236
3	0.000	0.030	181
4	0.000	0.026	153
5	0.000	0.023	135
6	0.000	0.020	122
7	0.000	0.019	112
8	0.000	0.018	104
9	0.000	0.016	97.9
10	0.000	0.016	92.6
11	0.000	0.015	88.1
12	0.000	0.014	84.2
13	0.000	0.014	80.7
14	0.000	0.013	77.7
15	0.000	0.013	74.9
16	0.000	0.012	72.5
17	0.000	0.012	70.3
18	0.000	0.011	68.2
19	0.000	0.011	66.3
20	0.000	0.011	64.6
21	0.000	0.011	63.0
22	0.000	0.010	61.5
23	0.000	0.010	60.2
24	0.000	0.010	58.9
25	0.000	0.010	57.7
26	0.000	0.009	56.5
27	0.000	0.009	55.4
28	0.000	0.009	54.4
29	0.000	0.009	53.5
30	0.000	0.009	52.5
31	0.000	0.009	51.7
32	0.000	0.009	50.8
33	0.000	0.008	50.1
34	0.000	0.008	49.3
35	0.000	0.008	48.6
36	0.000	0.008	47.9
37	0.000	0.008	47.2
38	0.000	0.008	46.6
39	0.000	0.008	46.0
40	0.000	0.008	45.4
41	0.000	0.008	44.8
42	0.000	0.007	44.3
43	0.000	0.007	43.8
44	0.000	0.007	43.3
45	0.000	0.007	42.8
46	0.000	0.007	42.3
47	0.000	0.007	41.8
48	0.000	0.007	41.4
49	0.000	0.007	41.0
50	0.000	0.007	40.6

Exceeds target GW concentrations

	ISS Area BT-01 Receptor Concentrations (ug/L) Post-ISS and Upgradient Source		
	TCE	GRO-TPH	DRO-TPH
Target Concentrations (ug/L)	0.5	800	500
Time (yr)			
1	0.10	50.1	991
2	0.10	50.0	656
3	0.10	50.0	601
4	0.10	50.0	573
5	0.10	50.0	555
6	0.10	50.0	542
7	0.10	50.0	532
8	0.10	50.0	524
9	0.10	50.0	518
10	0.10	50.0	513
11	0.10	50.0	508
12	0.10	50.0	504
13	0.10	50.0	501
14	0.10	50.0	498
15	0.10	50.0	495
16	0.10	50.0	492
17	0.10	50.0	490
18	0.10	50.0	488
19	0.10	50.0	486
20	0.10	50.0	485
21	0.10	50.0	483
22	0.10	50.0	482
23	0.10	50.0	480
24	0.10	50.0	479
25	0.10	50.0	478
26	0.10	50.0	477
27	0.10	50.0	475
28	0.10	50.0	474
29	0.10	50.0	473
30	0.10	50.0	473
31	0.10	50.0	472
32	0.10	50.0	471
33	0.10	50.0	470
34	0.10	50.0	469
35	0.10	50.0	469
36	0.10	50.0	468
37	0.10	50.0	467
38	0.10	50.0	467
39	0.10	50.0	466
40	0.10	50.0	465
41	0.10	50.0	465
42	0.10	50.0	464
43	0.10	50.0	464
44	0.10	50.0	463
45	0.10	50.0	463
46	0.10	50.0	462
47	0.10	50.0	462
48	0.10	50.0	461
49	0.10	50.0	461
50	0.10	50.0	461

Exceeds target GW concentrations

Table 5
GW Model
Post-ISS Receptor Concentrations
Bulk Terminal Property

	ISS Area BT-01 Receptor Concentrations (ug/L) Post-ISS		
	TCE	GRO-TPH	DRO-TPH
Target Concentrations (ug/L)	0.5	800	500
Time (yr)			
51	0.000	0.007	40.2
52	0.000	0.007	39.8
53	0.000	0.007	39.4
54	0.000	0.007	39.0
55	0.000	0.006	38.7
56	0.000	0.006	38.3
57	0.000	0.006	38.0
58	0.000	0.006	37.6
59	0.000	0.006	37.3
60	0.000	0.006	37.0
61	0.000	0.006	36.7
62	0.000	0.006	36.4
63	0.000	0.006	36.1
64	0.000	0.006	35.8
65	0.000	0.006	35.5
66	0.000	0.006	35.3
67	0.000	0.006	35.0
68	0.000	0.006	34.7
69	0.000	0.006	34.5
70	0.000	0.006	34.2
71	0.000	0.006	34.0
72	0.000	0.006	33.7
73	0.000	0.006	33.5
74	0.000	0.006	33.3
75	0.000	0.006	33.1
76	0.000	0.006	32.8
77	0.000	0.005	32.6
78	0.000	0.005	32.4
79	0.000	0.005	32.2
80	0.000	0.005	32.0
81	0.000	0.005	31.8
82	0.000	0.005	31.6
83	0.000	0.005	31.4
84	0.000	0.005	31.2
85	0.000	0.005	31.0
86	0.000	0.005	30.9
87	0.000	0.005	30.7
88	0.000	0.005	30.5
89	0.000	0.005	30.3
90	0.000	0.005	30.2
91	0.000	0.005	30.0
92	0.000	0.005	29.8
93	0.000	0.005	29.7
94	0.000	0.005	29.5
95	0.000	0.005	29.4
96	0.000	0.005	29.2
97	0.000	0.005	29.0
98	0.000	0.005	28.9
99	0.000	0.005	28.8
100	0.000	0.005	28.6

Exceeds target GW concentrations

	ISS Area BT-01 Receptor Concentrations (ug/L) Post-ISS and Upgradient Source		
	TCE	GRO-TPH	DRO-TPH
Target Concentrations (ug/L)	0.5	800	500
Time (yr)			
51	0.10	50.0	460
52	0.10	50.0	460
53	0.10	50.0	459
54	0.10	50.0	459
55	0.10	50.0	459
56	0.10	50.0	458
57	0.10	50.0	458
58	0.10	50.0	458
59	0.10	50.0	457
60	0.10	50.0	457
61	0.10	50.0	457
62	0.10	50.0	456
63	0.10	50.0	456
64	0.10	50.0	456
65	0.10	50.0	456
66	0.10	50.0	455
67	0.10	50.0	455
68	0.10	50.0	455
69	0.10	50.0	454
70	0.10	50.0	454
71	0.10	50.0	454
72	0.10	50.0	454
73	0.10	50.0	454
74	0.10	50.0	453
75	0.10	50.0	453
76	0.10	50.0	453
77	0.10	50.0	453
78	0.10	50.0	452
79	0.10	50.0	452
80	0.10	50.0	452
81	0.10	50.0	452
82	0.10	50.0	452
83	0.10	50.0	451
84	0.10	50.0	451
85	0.10	50.0	451
86	0.10	50.0	451
87	0.10	50.0	451
88	0.10	50.0	451
89	0.10	50.0	450
90	0.10	50.0	450
91	0.10	50.0	450
92	0.10	50.0	450
93	0.10	50.0	450
94	0.10	50.0	450
95	0.10	50.0	449
96	0.10	50.0	449
97	0.10	50.0	449
98	0.10	50.0	449
99	0.10	50.0	449
100	0.10	50.0	449

Exceeds target GW concentrations

Time Oil Bulk Terminal PPA

Supplemental Upland Remedial Investigation and Feasibility Study

Appendix F
Treatability Study Report: Column Study to Evaluate Remediation of Chlorinated Solvents in Groundwater Using Zero Valent Iron

Prepared for:

Geosyntec Consultants, Inc.
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Treatability Study Report

Column Study to Evaluate Remediation of Chlorinated Solvents in Groundwater Using Zero Valent Iron

Time Oil Site, Seattle, Washington

Prepared by:

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SiREM Ref: CHE8384

22 August 2019

siremlab.com

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LIST OF ABBREVIATIONS

%	percent
°C	degrees Celsius
°C/min	degrees Celsius per minute
µg/L	micrograms per liter
µL	microliters
BTEX	benzene, ethylbenzene, toluene and xylene
$CaCO_3$	calcium carbonate
cDCE	cis-1,2-dichloroethene
cm	centimeters
cVOC	chlorinated volatile organic compound
DHG	dissolved hydrocarbon gases
f	degradation pathway mole fraction
FID	flame ionization detector
ft	feet
g	grams
GC	gas chromatography
Geosyntec	Geosyntec Consultants, Inc.
gZVI	granular zero valent iron
h	hours
IC	ion chromatograph
ICP-MS	inductively coupled plasma – mass spectroscopy
k	rate constant
L	liter
MDL	method detection limit
mg $CaCO_3$/L	milligrams of calcium carbonate per liter
mg/L	milligrams per liter
min	minute
mL	milliliters
mL/min	milliliters per minute
mm	millimeters
mM	millimolar
mV	millivolts
mZVI	microscale zero valent iron
ORP	oxidation reduction potential
PHC	Petroleum Hydrocarbons
PRB	permeable reactive barrier
PV	pore volume
PV/day	pore volume per day
QA/QC	quality assurance/quality control
QL	quantitation limits
r^2	coefficient of determination
RPM	revolutions per minute
SiREM	SiREM Laboratories
$t_{½}$	half life

LIST OF ABBREVIATIONS
CONTINUED

TCE	trichloroethene
TDS	total dissolved solids
TOC	total organic carbon
VC	vinyl chloride
VOA	volatile organic analysis
ZVI	zero valent iron

1 Introduction

SiREM Laboratory (SiREM) was retained by Geosyntec Consultants Inc. (Geosyntec) to perform a laboratory bench scale treatability column study. The study was conducted to evaluate the performance of commercial zero valent iron (ZVI) products for a potential permeable reactive barrier (PRB) application for the remediation of chlorinated volatile organic compounds (cVOCs), including tetrachloroethene (TCE) and cis 1,2-dichloroethene (cDCE) in groundwater at the Time Oil Site, Seattle, WA (the Site). Petroleum hydrocarbon compounds (PHCs) and benzene, toluene, ethylbenzene, and xylenes (BTEX) were also monitored during the study.

The remainder of this report contains:

- study objectives and scope of work (Section 2);
- experimental methods (Section 3);
- cVOC results and discussion including calculation of cVOC degradation half-lives (Section 4);
- discussion of inorganic chemistry changes during the column study (Section 5);
- study conclusions (Section 6); and
- report references (Section 7).

2 Objectives and Scope of Work

The objectives and scope of work completed to satisfy the project objectives are provided in this section.

2.1 Objectives

The primary objectives of the laboratory ZVI column test were to:

- Determine degradation rates for the main cVOCs (i.e., TCE and cDCE) in site groundwater with two types of commercial ZVI products under flowing water conditions;
- Assess the effect of PHCs which are present in the site groundwater on the cVOC degradation by ZVI;
- Characterize behavior of chlorinated breakdown products of TCE and cDCE (vinyl chloride [VC]), detected in the site water and quantify the rates of degradation; and
- Evaluate changes in inorganic geochemistry caused by ZVI corrosion chemistry, including possible mineral precipitation.

2.2 Scope of Work

A ZVI column test was set up and performed using a granular zero valent iron (gZVI) product used in applications of trenched PRBs and a microscale zero valent iron (mZVI) product used in applications of injected PRBs. For the gZVI, the column was packed with 100 percent (%) gZVI. For mZVI, the column was packed with a mixture of 1% by weight mZVI and 99% geologic material to simulate an injected mZVI amended subsurface zone. A control column was set up using 100% geologic material and Site groundwater containing cVOCs and PHCs. On 27 March 2019 the materials were packed into three columns with care. The column and materials specifications are provided in Table 1. A schematic of the columns is provided in Figure 1.

The groundwater and geologic material for this study were received by SiREM on 18 March 2019. The chain of custody for the groundwater and geologic material received from the Site is provided in Appendix A. On 27 March 2019, the Site groundwater was transferred into the influent reservoir. Sampling and analysis of the initial influent reservoir resulted in a TCE concentration of 1.57 milligrams per liter (mg/L) which was at the target concentrations expected at the location of the proposed ZVI PRB. The water was pumped through the 100% gZVI column at a velocity of approximately 1 pore volume per day (PV/day). The flow rate through the Control Column and 1% mZVI Column corresponded to approximately 2 PV/day.

Water samples were collected from sampling ports located along the column length as well as from the column influent and effluent for analysis of pH, oxidation reduction potential (ORP), cVOCs, dissolved hydrocarbon gases (DHGs), PHCs, BTEX, cations, anions, total organic carbon (TOC), total dissolved solids (TDS) and alkalinity according to the schedule presented in Table 2.

The cVOC concentration trends from the column test were used to calculate the degradation rates for each compound detected using a multicomponent first-order kinetic model. Finally, the column

water chemistry data were used to assess the potential effects of water chemistry on the long-term reactivity of ZVI under Site conditions.

3 Test Methods and Materials

This section describes the methods used to construct and operate the columns and to collect water samples for analysis during the ZVI column treatability study.

3.1 Column Construction

Based on instruction provided by Geosyntec, the gZVI material was obtained from Connelly GPM (Chicago, IL). The 1% mZVI Column contained mZVI (Ferox Flow) from Hepure Technologies, Inc. (Flemington, New Jersey), 49.5% of site geologic material and 49.5% of silica sand. The Control Column contained 100% geologic material. Based on the manufacturer's specifications, the gZVI material had a particle size range from under 0.25 to 2.00 millimeters (mm; 8 to 50 US Mesh) and the mZVI material had a particle size range from under 0.044 to 0.25 mm (60 to 325 US Mesh). The sand material had a particle size range from 0.35 to 0.55mm (20 to 55 US Mesh).

The columns were constructed of Plexiglas™ with a length of 1.80 feet (ft) (55 centimeters [cm]) and an internal diameter of 0.12 ft (1.5 inches, 3.8 cm) (Figure 1). A 0.16-ft (5 cm) thick zone of coarse sand was placed in the bottom of the column to disperse and equilibrate the flow through the column. Seven sampling ports were positioned vertically along the central axis of the column at distances of 0.08, 0.16, 0.33, 0.49, 0.66, 0.98 and 1.31 ft from the top of the sand plug. All sampling ports within the column (excluding influent and effluent) were constructed using a nylon Swagelok compression fitting tapped into the column. A 16-gauge needle was positioned through the fitting and secured by tightening the ferrule. Glass wool was threaded through the needle to ensure minimal particulates from entering the samples. Each sample port was then fitted with a Luer-Lock™ fitting so that a glass syringe could be attached to the port for collection of water samples. All sampling ports were used to monitor the 100% gZVI column, while the influent, effluent and three side ports were used for the 1% mZVI Column. Only influent and effluent were monitored in the Control column.

To ensure a homogeneous column material bed, columns were packed vertically in the column in 100 gram (g) increments. The Site geologic material was homogenized by hand prior to use for packing of the 1% mZVI Column. To assure a homogeneous and permeable mixture, the Site geologic material was first combined in a 1:1 ratio with silica sand in 100 g batches. Once the sand/geologic material batches were prepared, the mZVI was mixed in at 1% by weight prior to packing the columns in 100 g vertical lift sections. In each column, prior to packing the geologic material and amendments, the initial 0.16 ft of the column was packed with silica sand. Values of bulk density, porosity, and pore volume were determined by weight and are provided in Table 1. The column experiment was performed at a room temperature of 22 degrees Celsius (°C).

Dedicated Masterflex® peristaltic pumps were used to feed Site water bottom-up through the columns. The pump tubing consisted of Viton® 2-stop tubing. All other tubing was 1/8 inch inside diameter Teflon® tubing.

3.2 Site Groundwater Storage and Usage

Thirteen 1 gallon jugs were received by SiREM personnel on 18 March 2019. The groundwater was stored in cold storage at 4 °C until study commencement. The 3 columns were fed water from the same influent reservoir filled with the Site groundwater. For the first influent reservoir

filling, four 1 gallon jugs were removed from cold storage and the Site water was siphoned into a 20 liter (L) Tedlar® bag with minimal headspace. The bag was set up on a scale to determine the actual volume of water added. The influent reservoir contained two Swagelok fittings with Teflon® septa. This allowed for sampling, as required, while minimizing cVOC losses during the test. The influent reservoir was refilled with four 1 gallon jugs as described above on 9 May 2019.

3.3 Sampling Procedure

After removing the stagnant water from the sampling needles, 4.0 milliliter (mL) samples were collected from the column sampling ports using glass on glass syringes. A 1 mL water sample was removed from the glass syringe and transferred immediately into an autosampler vial for gas chromatography (GC) analysis of cVOCs and DHGs. The remaining 3 mL sample was transferred into a 5 mL plastic vial for ORP and pH measurement. A 0.5 mL subsample of the 3 mL was then collected for anion (chloride, nitrate-N, nitrite-N, sulfate and phosphate) analysis and was transferred to a 1.5 mL Eppendorf tube, which was stored frozen until time of analysis.

Water samples for BTEX and PHC analysis were collected from the column influent only at time 0 and from the column influent and effluents at 5 timepoints throughout the study. A 100 mL sample was collected directly into a 100 mL amber glass bottle and a 40 mL sample was collected directly into a 40 mL VOA vial. The influent and effluent samples were preserved with sodium bisulfate as preservative.

Water samples for cations, alkalinity, TDS and TOC analyses were collected at time 0 from the column influent only and at endpoint from the column influent and effluents. For cations, a 20 mL unfiltered sample was collected directly into a 20 mL volatile organic analysis (VOA) vial and acidified to a pH of 2 with nitric acid. For alkalinity and TDS, a 40 mL unfiltered sample was collected directly into a 40 mL VOA and left unpreserved. For TOC analysis a 40 mL unfiltered sample was collected directly into a 40 mL VOA vial and acidified to a pH of 2 with sulfuric acid.

Water samples for, cations, alkalinity, TDS and TOC were placed in coolers with ice packs and shipped under chain of custody to SGS, Lakefield, Ontario for analysis. Samples for BTEX/PHC analyses were sent to ALS Global, Waterloo, Ontario for analysis. Original laboratory reports from SGS and ALS are presented in Appendices B and C, respectively.

3.4 Analytical Methods

This section describes the methods of analysis for pH, ORP, cVOCs, DHGs, BTEX/PHC, cations, anions, TOC, TDS and alkalinity.

3.4.1 Analysis of ORP and pH

The ORP measurements were performed using an Orion 250A meter with double junction ORP electrode. A 3.0 mL sample was collected and the ORP probe was inserted into the sample vial on the lab bench. A single point calibration of the meter was performed at each sampling event with Zobell ORP calibration solution according to the manufacturer's instructions.

The pH measurements were performed using an Oakton pH spear with combination pH electrode. Immediately after ORP measurement the pH probe was inserted into the same sample vial on the

lab bench for pH measurement. The pH meter was calibrated at the beginning of each sampling session using pH 4.0, 7.0 and 10 standards that were changed daily.

3.4.2 Analysis of cVOCs and DHGs

Water sample cVOC and DHG (i.e., ethene, ethane and methane) analyses were performed at SiREM using an Agilent 7890 GC with Agilent G1888 headspace autosampler programmed to heat each sample vial to 75 °C for 45 minutes (min) prior to headspace injection into a GSQ Plot column (0.53 mm x 30 meters, J&W) and flame ionization detector (FID). Sample vials were heated to ensure that all VOCs in the aqueous sample would partition into the headspace. The injector temperature was 200 °C, and the detector temperature was 250 °C. The oven temperature was programmed as follows: 35 °C for 2 min, increased to 100 °C at 50 degrees Celsius per minute (°C/min), then increased to 185 °C at 25 °C/min and held at 185 °C for 6.80 min. The carrier gas was helium at a flow rate of 11 milliliters per minute (mL/min).

After withdrawing a 1.0 mL sample, the sample was injected into a 10 mL auto sampler vial containing 5.0 mL of acidified deionized water (pH ~2). The water was acidified to inhibit microbial activity between microcosm sampling and GC analysis. The vial was sealed with an inert Teflon®-lined septum and aluminum crimp cap for automated injection of 3 mL of headspace onto the GC. One cVOC standard was analyzed with each set of samples to verify the instrument five-point calibration curve using methanolic stock solutions containing known concentrations of the target analytes. Calibration was performed using external standards purchased as standard solutions (Sigma, St Louis, Missouri), where known volumes of standard solutions were added to acidified water in auto sampler vials and analyzed as described above for microcosm samples. Data were integrated using ChemStation Software (Agilent Technologies, Santa Clara, California).

The method quantitation limits (QLs) in micrograms per liter (µg/L) achieved at SiREM were as follows:

Organic Compound	QL (µg/L)
Vinyl Chloride (VC)	10
cis-1,2-Dichloroethene (cDCE)	10
Trichloroethene (TCE)	10
Methane	50
Ethene	10
Ethane	10

3.4.3 Analysis of Major Anions

Anion analysis was performed on a Thermo-Fisher ICS-2100 ion chromatograph (IC) equipped with a Thermo-Fisher AS-DV auto sampler and an AS18 column. An isocratic separation was performed using 33 millimolar (mM) reagent grade sodium hydroxide (Thermo Scientific, Oakville, ON) eluent for 15 min at a flow rate of 0.25 mL/min. One standard was analyzed with each set of samples tested in order to verify the seven-point calibration using external standards of known concentrations. External standards were prepared gravimetrically using chemicals of the highest purity available (Sigma St Louis, MO or Bioshop, Burlington, ON). Data were integrated using

Chromeleon 7 Chromatography software (Thermo Scientific, Oakville, ON). The QLs were as follows: 0.07 mg/L chloride, 0.09 mg/L nitrite-N, 0.09 mg/L nitrate-N, 0.07 mg/L sulfate, and 0.07 mg/L phosphate.

A 0.5 mL sample was withdrawn from the 3.0 mL pH and ORP sample (as described in Section 3.3) and was placed in a 1.5 mL micro-centrifuge tube. Samples were centrifuged for five minutes at 13,000 revolutions per minute (RPM) to remove solids. The supernatant was sub-sampled, diluted 50-fold in deionized water and placed in a Thermo-Fisher auto sampler vial with a cap that filters the sample during automated injection onto the IC through a 25 microliter (µL) sample loop.

3.4.4 Analysis of Cations, TOC, TDS and Alkalinity

SGS, Lakefield, Ontario performed the following analyses:

- Water sample major cation analyses including iron, sodium, magnesium, calcium, potassium and manganese using EPA SW-846 6020A (inductively coupled plasma – mass spectroscopy [ICP-MS]);
- Carbonate alkalinity (expressed as milligrams calcium carbonate per liter [mg $CaCO_3$/L) in water determined using method US EPA Method SM 2320B;
- TDS analysis using US EPA Method SM 2450; and
- TOC analyses using US EPA Method 9060A.

Copies of the original laboratory reports from SGS are presented in Appendix B.

3.4.5 Analysis of BTEX and PHC Compounds

ALS Global, Waterloo, Ontario performed the following water sample analyses:

- BTEX using method SW846 8260 (511)
- F1-F4 Hydrocarbons using method CCME CWS-PHC

Copies of the original laboratory reports from ALS are presented in Appendix C.

4 Column Results, Reaction Pathways and Degradation Parameters

This section discusses the observed water cVOC concentration trends. The column data are then quantified in terms of anticipated cVOC degradation pathways and kinetic rates.

4.1 cVOC Results

At the flow rates used in the test (Table 1), approximately 32, 22 to 48 pore volumes (PVs) of water passed through the Control, 1% mZVI and 100% gZVI Columns, respectively during the test. One pore volume in these three columns corresponded to a residence time of approximately 40, 44 and 23 hours (h) for the Control, 1% mZVI and 100% gZVI Columns, respectively. Complete water sample cVOC concentration data from all sampling events are provided in Tables 3, 4 and 5. Analytical results for the cVOC compounds (TCE, cDCE and VC) as well as dechlorination products (ethene and ethane) and methane for the last sampling events are presented in Figures 2, 3 and 4.

The influent concentrations of TCE and cDCE decreased slightly over time, likely due to volatilization losses during Site water storage and handling. The TCE concentrations decreased slightly along the Control Column, likely due to adsorption onto sand, while no changes in cDCE concentrations were observed in the Control Column effluent (Figure 2, Table 3).

In the last column profile in the 1% mZVI Column, the influent TCE concentration of approximately 1.05 mg/L decreased to non-detect by the second sample port at a residence time of 13.5 h (Figure 3, Table 4). The cDCE concentration of 0.085 mg/L in the column influent decreased to 0.07 mg/L in the first port at 4.3 h residence time, and then fluctuated at approximately 0.10 mg/L in the remainder of the column. VC was not observed in the column. The observed increases in ethene concentration to between 0.01 and 0.16 mg/L confirm that TCE was dechlorinated. The lack of ethane detections indicated that the reducing conditions were not sufficiently low to induce reduction of ethene to ethane. This is expected in a mZVI-soil system containing a relatively small amount of mZVI. Detectable concentrations of methane of approximately 0.05 mg/L were observed consistently in the effluent of the 1% mZVI Column in all sampling events performed after 5.7 PVs have passed through the column. Methane generation is related to microbial processes.

In the last column profile in the 100% gZVI Column, the influent TCE concentration of 1.05 mg/L decreased to non-detect at a residence time of 14.2 h (Figure 4, Table 5). The influent cDCE concentration of 0.08 mg/L decreased gradually to non-detect in the column effluent at a residence time of 23.3 h. Similar to the 1% mZVI column, VC was not observed in this column. Both ethene and ethane were created which is consistent with the TCE and cDCE dechlorination pathway in the presence of pure ZVI (Figure 5). Methane was not generated in the 100% gZVI column.

The temporal concentration profiles obtained in the 1% mZVI column indicated relatively steady conditions for TCE degradation, while the cDCE concentration was not degraded from the start of the test (Figure 6). In fact, the concentration of cDCE increased gradually throughout the test, exceeding the influent value in the latter part of the test. This indicates that the cDCE degradation rate decreased with time and was not fast enough to consume the cDCE created from TCE

degradation. The TCE and cDCE concentration profiles in the 100% gZVI also showed a gradual migration of both compounds through the column during the test period, which is an indication of a gradual loss in ZVI reactivity (Figure 7). Although a gradual decrease in reactivity of ZVI is expected with time due to ZVI consumptions and creation of secondary precipitation on the ZVI grains, the rate of this process in this test was faster than that observed in other ZVI tests for waters containing TCE and cDCE. As described below, based on the analytical data obtained in the column, the most likely reasons for the faster than expected ZVI consumption in the test columns were:

- Interference from dissolved PHC with TCE and cDCE migration to ZVI surfaces and contact with surface reactive sites; and
- Establishment of anaerobic microbial activity, including sulfate reducing bacteria (as evidenced by the observed sulfate reduction in the latter part of the test) and methanogenic bacteria. The development of microbial activity was likely related to the presence of a labile carbon source in the form of PHCs. Both sulfate reducers and methanogens are known to degrade TCE to cDCE and would have contributed to the build up and slower degradation of cDCE in the column.

4.2 PHC Results

Table 6 provides analytical results for PHCs and BTEX collected from the influent and effluents of the three columns in 5 sampling events that were performed within the test period. The influent water did not contain BTEX compounds, but the concentrations of Fraction 1 (F1) PHCs in the influent water ranged from 196 to 286 µg/L. No other PHC fractions were detected in the influent water. Given the lack of BTEX, only aliphatic short-chained hydrocarbons (i.e., C10-C16) were present in the water. The influent F1 PHC concentrations were partially reduced in the effluent of the Control Column, while full attenuation of F1 PHC was observed in both ZVI-containing columns. The losses of dissolved F1 PHC in the columns indicate adsorption onto solids including ZVI grains. It is believed that this process has interfered with the degradation of TCE and cDCE, resulting in the observed loss of reactivity described above.

Despite no BTEX detection in the influent water, detectable concentrations of benzene and toluene were detected in the 100% gZVI column effluent throughout the test (Table 6). To investigate the source of these compounds, a duplicate sample of fresh gZVI was sent for solid analyses of BTEX compounds. As shown in Table 7, benzene, toluene and xylene were detected in the gZVI material which indicate that leaching from the ZVI was the likely source of the BTEX detections in the effluent. The gZVI is manufactured from iron filing waste material generated from machining parts made from cast iron (e.g., brake drums, engine blocks). This process uses cutting oil and other lubricants that may include BTEX compounds if not removed during material processing. The gZVI vendor maintains that these organic compounds are removed during heat treatment used in gZVI manufacturing. It is recommended that if the same ZVI supplier is used for the field installation that they be required to meet the specifications for no BTEX contamination and that BTEX analysis be included as part of the quality assurance/quality control (QA/QC) program on the provided material.

4.3 cVOC Reaction Pathways and Kinetic Expressions

Two dominant pathways for the degradation of chlorinated ethene compounds by ZVI include hydrogenolysis and reductive β-elimination (Gillham et al., 2010). In the hydrogenolysis reaction, a chlorine atom is replaced by a hydrogen atom, accompanied by the addition of two electrons (from the iron). Reductive β-elimination involves release of two chlorine atoms and the formation of an additional carbon-carbon bond. Both pathways are thought to occur simultaneously (Arnold and Roberts, 2000). Figure 5 illustrates those pathways for the chlorinated ethene sequence starting from PCE, through TCE, the dichloroethene-isomers, VC and finally ethene and ethane. Both of the chlorinated acetylenes are highly unstable and degrade rapidly, primarily through reductive dechlorination to acetylene (Arnold and Roberts, 2000). Another ZVI-mediated transformation mechanism, hydrogenation, involves the addition of two hydrogen atoms across two carbon atoms with the removal of a carbon-carbon bond (e.g., reduction of acetylene to ethene, and ethene to ethane as shown in Figure 5).

Based on previous research, the VOC degradation in contact with ZVI appears to be first-order with respect to the concentration of the contaminant (pseudo first-order) (Gillham et al., 2010):

$$\frac{\partial C}{\partial t} = -kt \tag{1}$$

After integration, the equation can be presented in the form of the exponential decay equation:

$$C = C_0 e^{-kt} \tag{2}$$

Where C is the concentration in solution at a particular time (t),

C_o is the initial concentration, and

k is the first-order rate constant.

The rate constant (k) is a measure of the reaction rate and can be calculated directly from Equation 2. The time at which the initial concentration declines by one-half, ($C/C_o = 0.5$), is the half-life ($t_{1/2}$).

$$t_{1/2} = \frac{\ln(2)}{k} \tag{3}$$

4.4 Determination of Degradation Parameters from Column Data

Due to the complexity of the ZVI-induced dechlorination mechanisms (Figure 5), the laboratory data were interpreted using a multi-component kinetic model to quantify degradation rates of compounds that are present in the water initially, as well as potential degradation products. In the model, potential breakdown products are concurrently produced and degraded as described by first-order kinetic equations. Each pathway is characterized by a rate constant, k, and the mole fraction of the compound that follows that particular path (f). Since chlorinated acetylenes are unstable, short-lived intermediates that are rapidly reduced to ethene (Arnold and Roberts, 2000) these compounds are not typically detected in the solution phase and are therefore not explicitly

contained in the degradation model. Therefore, first-order rate equations for each VOC included in the model are as follows:

$$\frac{\partial PCE}{\partial t} = -k_{PCE} PCE \quad (4)$$

$$\frac{\partial TCE}{\partial t} = f_{PCE1} k_{PCE} PCE - k_{TCE} TCE \quad (5)$$

$$\frac{\partial cDCE}{\partial t} = f_{PCE2} k_{PCE} PCE + f_{TCE1} k_{TCE} TCE - k_{cDCE} cDCE \quad (6)$$

$$\frac{\partial VC}{\partial t} = f_{PCE3} k_{PCE} PCE + f_{TCE2} k_{TCE} TCE + f_{cDCE} k_{cDCE} cDCE - k_{VC} VC \quad (7)$$

These equations were adapted for the computer program Scientist® Version 3.0 (Micromath Research, 2008). The program can be used to fit the first-order equations to experimental data using the least squares best-fit method. The degradation rate and molar conversion are determined for each compound sequentially starting with the most chlorinated VOC. The results from the model fitting of column data include half-lives for all VOCs selected and statistical fit data including coefficient of determination (r^2) values and molar conversions from the parent to the breakdown compounds. The half-lives determined from the cVOC profiles from the three final sampling events in both columns are shown in Table 8, along with the corresponding r^2 values.

The degradation model provided relatively good fits for most cVOC concentration profiles with r^2 values over 0.86, but generally poorer fits were obtained for cDCE compared to TCE (Table 8). The half-lives calculated for the 1% mZVI Column at the end of the test were 1.8 h for TCE and 128 h for cDCE. The TCE and cDCE half-lives at the end of the test in the 100% gZVI Column were 2.2 h and 8.3 h, respectively. The degradation model provided best data fit for a TCE to cDCE conversion of 5%(molar) for the 1% mZVI Column and between 1.5 and 6.7% in the 100% gZVI Column. The typical TCE-cDCE conversions rates of between 5 to 10% have been observed for commercial ZVI sources, based on previous testing.

The TCE degradation half-lives values achieved in both columns were generally close to average values achieved in previous commercial ZVI testing for the same compounds reported by Gillham et al. (2010). However, the degradation half-lives for cDCE were substantially longer than those measured for TCE, based on previous experience and the above reference. As indicated above (Section 4.1.), a gradual loss of reactivity towards cVOC was indicated by a migration of the concentration profiles through the column, especially in the 100% gZVI column. This phenomenon is also expressed as the increase in the degradation half-lives with time (Table 8).

5 Inorganic Chemistry Results and Discussion

Previous research has shown that the inorganic composition of the treated groundwater can have a profound influence on the reactivity of commercial ZVI materials. Therefore, evaluation of changes in inorganic chemistry along the flow path through the ZVI columns is a crucial component of design considerations for a ZVI PRB.

5.1 Column Data

Samples from the columns for pH, ORP and anion concentration profiles were collected during the test and the results are summarized in Tables 9, 10 and 11. Samples from the column influent and effluent for detailed geochemical characterization were collected at baseline and the end of the test (Table 11). Laboratory reports of analysis for the cations, TOC, TDS and alkalinity are compiled in Appendix B.

When ZVI is exposed to water, several reactions occur as a result of iron corrosion:

$$Fe^{\circ} \rightarrow Fe^{2+} + 2e^{-} \quad (8)$$

This ZVI corrosion drives the geochemical changes that occur as groundwater flows through the ZVI PRB. When groundwater first contacts the granular iron, any dissolved oxygen present is consumed via iron corrosion:

$$4Fe^{\circ} + 3O_{2(aq)} + 12H^{+} \rightarrow 4Fe^{3+} + 6H_2O \quad (9)$$

After the initial, rapid depletion of any dissolved oxygen and other oxidizers (e.g., nitrate), the water corrosion of iron dominates to produce hydrogen and hydroxide resulting in an increase in pH and decline in ORP:

$$Fe^{\circ} + 2H_2O \rightarrow Fe^{2+} + H_{2(aq)} + 2OH^{-} \quad (10)$$

The ORP and pH profiles within the ZVI columns are presented in Tables 9, 10 and 11 and Figure 8. No substantial changes in pH an ORP occurred in the Control column. At the end of the test in the 1% mZVI column, the ORP decreased from +123 millivolts (mV) in the influent to between -51 and +64 mV in the column. The pH increased from influent value of 7.3 to 7.95 in the column effluent, which is the expected result of ZVI corrosion chemistry shown in Eq. 10. In the 100% gZVI column, the ORP decreased from +150 mV in the influent to between -207 and -16 mV in the column, while the pH increased from influent value of 7.3 to 9.4 in the column effluent. The more pronounced ORP and pH gradients created in the two columns were expected given the difference in the ZVI content in the beds of the two columns. However, the drop in the ORP values in both ZVI columns became less pronounced as the test progressed (Table 10 and 11). This trend is another indication of the gradual decrease in the corrosion rate which drives those gradients and it is consistent with the observed gradual decrease in the degradation rate of cDCE.

The influent calcium concentration was 26.3 mg/L and carbonate alkalinity was 182 mg/L as calcium carbonate ($CaCO_3$) (Table 12). The concentration of both constituents remained essentially unchanged in the 1% mZVI Column. In contrast in the 100% gZVI Column, the calcium and alkalinity decreased to 6.9 and 91 mg/L, respectively at the end of the test. This indicates that due to the increase in the pH in the 100% gZVI Column, precipitation of $CaCO_3$ and possibly iron carbonate has occurred.

$$\text{Aragonite/Calcite: } Ca^{2+} + CO_3^{2-} \rightarrow CaCO_{3(s)} \quad (13)$$

Precipitation of carbonate mineral phases is commonly observed in standard ZVI system due to the pH shift to the alkaline range.

Total dissolved iron was detected at 0.04 mg/L in the influent water and it increased to 0.46 and 0.09 mg/L in the 1% mZVI Column and the 100% gZVI Column, respectively (Table 12). As indicated, reactions involving iron corrosions (Eq. 8 through 10) result in generation of oxidized ferrous or ferric iron.

Chloride behaves as a conservative tracer in ZVI systems and, as expected, the concentration remained essentially unchanged or increased slightly within the columns as a result of cVOC dechlorination (Table 1).

The trends in sulfate concentrations showed decreases in both the 1% mZVI and 100% gZVI Column. At the low redox potential created by ZVI corrosion sulfate may be reduced to sulfide by active sulfate reducing bacteria:

$$SO_4^{2-} + 9H^+ + 8e^- \rightarrow HS^- + 4H_2O \quad (15)$$

In the presence of dissolved iron produced by ZVI corrosion and the hydrogen sulfide produced by sulfate reduction, the sulfate precipitates out of solution as iron sulfide.

$$Fe^{2+} + HS^- \rightarrow FeS_{(s)} + H^+ \quad (16)$$

Therefore, iron sulfide likely precipitated out within both ZVI columns. Previous results from testing showed that ZVI does not reduce sulfate abiotically. Therefore, the observed consumption of sulfate likely occurred via microbial sulfate reduction. The development of sulfate reducing microbial activity was likely related to the presence of a labile carbon source in the form of PHCs in the influent water. Microbially mediated sulfate reduction has been observed in long-term ZVI columns and in mature ZVI PRBs (Wilkin et al., 2003).

Silicon concentration decreased from 17.6 mg/L in the influent to 4.9 and 0.33 mg/L in the effluent of the 1% mZVI and 100% gZVI Columns, respectively. The losses in silicon is attributed to precipitation or adsorption on ZVI surfaces leading to the formation of a silica film or gel on the ZVI surface that may hinder contaminant access to active sites (Klausen et al., 2003).

5.2 Possible Mineral Precipitates and Their Effect

ZVI oxidation reactions (Equations 8-10) promote reductive dechlorination reactions, but at the same time are sources of ferrous iron and alkalinity. Because the pH and ORP gradients created by these reactions in the 100% gZVI column were much larger than in the 1% mZVI, precipitation of iron (oxy)hydroxides and calcium carbonate occurred in the 100% ZVI. However, losses of silicon and sulfate were observed in both columns and therefore formation of silica films and iron sulfides are expected to occur in both injected mZVI PRBs and 100% gZVI PRBs. We recommend that the influence of these processes on the ZVI reactivity and porosity be included in the long-term performance considerations for the field systems.

6 Conclusions

Bench-scale column treatability testing using Site water indicated that:

i) The 1% mZVI Column promoted complete degradation of TCE present in the Site water, but cDCE also present in the water was not degraded. In contrast, complete degradation of both TCE and cDCE was observed in the 100% gZVI Column.

ii) The TCE degradation half-lives generated in both ZVI columns were in the range of values reported in the literature for standard ZVI materials and other groundwaters with comparable cVOC composition. However, the obtained half-lives for cDCE observed in the 100% gZVI Column were longer (i.e., slower reaction rates) than the literature values for gZVI.

iii) The TCE and cDCE concentration profiles in the ZVI columns showed a gradual migration of both compounds through the column during the test period, which is an indication of a gradual loss in ZVI reactivity. This phenomenon was also indicated by a gradual decrease in the corrosion rate, as expressed by progressively less reductive conditions created within the columns during the test period.

iv) Changes in the water chemistry observed along the column indicated losses in both calcium and carbonate alkalinity in the 100% gZVI Column, consistent with formation of calcium carbonate precipitation. Decreases in dissolved silicon and sulfate indicative of silica type and iron sulfide solid accumulation were observed in both the 1% mZVI and the 100% gZVI Column. These processes contributed to the observed gradual decrease in ZVI reactivity towards TCE and cDCE. Therefore, it is recommended that an engineering safety factor be included in the ZVI volume design calculations for the proposed ZVI PRB to assure long-term efficiency.

v) Low concentrations of BTEX compounds were observed in the 100% gZVI column effluent, which was attributed to leaching from the gZVI material. To avoid BTEX contamination in the installed gZVI PRB, we recommend that the manufacturer be required to meet the specifications for no BTEX contamination and that BTEX analysis be included as part of the QA/QC program on the provided material.

7 References

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TABLES

TABLE 1
COLUMN AND MATERIALS SPECIFICATIONS
Time Oil, Seattle, WA

Column	Control Column	1% mZVI Column	100% gZVI Column
Column Content	100% Geologic Material	1% mZVI, 49.5 % Geological Material, 49.5 % Silica Sand	100% gZVI
ZVI Type	--	Ferox Flow	Connelly ZVI
ZVI Size Range	--	0.044 to 0.25 mm (60 to 325 US Mesh)	0.25 to 2.00 mm (8 to 50 US Mesh)
ZVI Dry Weight (g)	1,027	996	1,469
Column Length	1.80 feet (55 centimeters) [1]		
Column Inside Diameter	0.51 feet (15.5 centimeters)		
Measured Pore Volume (mL)	118.0	166.9	331.9
Porosity	0.19	0.27	0.53
Bulk Density (g/cm^3)	1.65	1.60	2.35
Average Flow Rate (ft/day)	1.09	0.97	1.85
Average Residence Time (h) [2]	39.8	44.4	23.3

Notes:

[1] - residence time in the column bed containing ZVI only
[2] - contains 5 cm of coarse sand in the influent end and 50 cm of ZVI
-- - not applicable
% - percent
cm^3- centimeter cubed
ft/day - feet per day
g - grams
g/cm^3 - grams per centimeter cubed
gZVI - granular zero valent iron
h - hours
mL - milliliters
mm - milimeters
mZVI - microscale zero valent iron

TABLE 2
COLUMN SAMPLING SCHEDULE
Time Oil, Seattle, WA

Event		Baseline (Week 0)			6 Sampling Events		3 Sampling Events	4 Sampling Events	Endpoint	
Sample Location		pH, ORP	cVOCs, DHGs	Anions, Cations, Alkalilnity, TOC, TDS	pH, ORP	cVOCs, DHGs	Major Anions	BTEX, PHCs	Cations, Alkalilnity, TOC, TDS	Anions
Column Influent		□ ● ○	□ ● ○	□ ● ○	□ ● ○	□ ● ○	□ ● ○	□ ● ○	□ ● ○	□ ● ○
Sampling Ports	A				○	○	○			
	B				● ○	● ○	● ○			
	C				○	○	○			
	D				● ○	● ○	● ○			
	E				○	○	○			
	F				○	○	○			
	G				● ○	● ○	● ○			
Column Effluent		□ ● ○	□ ● ○	□ ● ○	□ ● ○	□ ● ○	□ ● ○	□ ● ○	□ ● ○	□ ● ○

Notes:

□ indicates sample collected in Control Column
● indicates sample collected in 1% mZVI Column
○ indicates sample collected in 100% gZVI Column
BTEX - benzene, ethyl benzene, toluene, xylene
cVOCs - chlorinated volatile organic compounds
DHGs - dissolved hydrocarbon gases
gZVI - granular zero valent iron
mZVI - micro-scale zero valent iron
ORP - oxidation-reduction potential
PHC - petroleum hydrocarbons (Fractions F1-F4)
TDS - total dissolved solids
TOC - total organic carbon

TABLE 3
WATER SAMPLE cVOC AND DHG RESULTS - CONTROL COLUMN
Time Oil, Seattle, WA

			Influent	Effluent
Column Distance (ft)			**0.0**	**1.64**
Residence Time (hours)			**0.0**	**39.8**
Compound	Date	PV	Concentration (mg/L)	
TCE	29-Mar-19	0.0	1.27	--
	10-Apr-19	6.9	1.38	0.49
	18-Apr-19	11.3	1.25	0.61
	25-Apr-19	15.6	1.11	0.81
	02-May-19	20.3	1.15	0.90
	13-May-19	27.0	1.02	0.83
	22-May-19	32.0	1.05	0.87
cDCE	29-Mar-19	0.0	0.09	--
	10-Apr-19	6.9	0.09	0.08
	18-Apr-19	11.3	0.09	0.09
	25-Apr-19	15.6	0.09	0.09
	02-May-19	20.3	0.09	0.10
	13-May-19	27.0	0.08	0.09
	22-May-19	32.0	0.08	0.11
VC	29-Mar-19	0.0	<0.01	--
	10-Apr-19	6.9	<0.01	<0.01
	18-Apr-19	11.3	<0.01	0.01
	25-Apr-19	15.6	0.01	0.01
	02-May-19	20.3	<0.01	0.01
	13-May-19	27.0	<0.01	<0.01
	22-May-19	32.0	<0.01	0.01
Ethene	29-Mar-19	0.0	<0.01	--
	10-Apr-19	6.9	<0.01	<0.01
	18-Apr-19	11.3	<0.01	<0.01
	25-Apr-19	15.6	<0.01	<0.01
	02-May-19	20.3	<0.01	<0.01
	13-May-19	27.0	<0.01	<0.01
	22-May-19	32.0	<0.01	<0.01
Ethane	29-Mar-19	0.0	<0.01	--
	10-Apr-19	6.9	<0.01	<0.01
	18-Apr-19	11.3	<0.01	<0.01
	25-Apr-19	15.6	<0.01	<0.01
	02-May-19	20.3	<0.01	<0.01
	13-May-19	27.0	<0.01	<0.01
	22-May-19	32.0	<0.01	<0.01
Methane	29-Mar-19	0.0	<0.05	--
	10-Apr-19	6.9	<0.05	<0.05
	18-Apr-19	11.3	<0.05	<0.05
	25-Apr-19	15.6	<0.05	<0.05
	02-May-19	20.3	<0.05	<0.05
	13-May-19	27.0	<0.05	<0.05
	22-May-19	32.0	<0.05	<0.05

Notes:

-- - not applicable
< - not detected, the associated value is quantitation limit
cDCE - cis-1,2-dichloroethene
cVOC - chlorinated volatile organic compound
DHG - dissolved hydrocarbon gasses
ft - feet
mg/L - milligrams per liter
PV - pore volumes
TCE - trichloroethene
VC - vinyl chloride

TABLE 4
WATER SAMPLE cVOC AND DHG RESULTS - 1% mZVI COLUMN
Time Oil, Seattle, WA

			Influent	Port B	Port D	Port G	Effluent
Column Distance (ft)			**0.0**	**0.16**	**0.50**	**1.31**	**1.64**
Residence Time (hours)			**0.0**	**4.3**	**13.5**	**35.5**	**44.4**
Compound	Date	PV	Concentration (mg/L)				
TCE	5-Apr-19	0.0	1.27	--	--	--	--
	10-Apr-19	2.4	1.38	0.29	0.08	0.04	0.05
	18-Apr-19	5.7	1.25	0.27	0.06	0.02	0.02
	25-Apr-19	7.8	1.11	0.34	0.04	<0.01	0.01
	02-May-19	11.5	1.15	0.28	0.06	<0.01	<0.01
	13-May-19	17.2	1.02	0.27	0.02	<0.01	<0.01
	22-May-19	32.0	1.05	0.19	<0.01	<0.01	<0.01
cDCE	5-Apr-19	0.0	0.09	--	--	--	--
	10-Apr-19	2.4	0.09	0.08	0.08	0.05	0.03
	18-Apr-19	5.7	0.09	0.07	0.07	0.06	0.06
	25-Apr-19	7.8	0.09	0.07	0.04	0.08	0.07
	02-May-19	11.5	0.09	0.08	0.08	0.11	0.10
	13-May-19	17.2	0.08	0.07	0.09	0.11	0.11
	22-May-19	32.0	0.08	0.07	0.10	0.10	0.11
VC	5-Apr-19	0.0	<0.01	--	--	--	--
	10-Apr-19	2.4	<0.01	<0.01	<0.01	<0.01	<0.01
	18-Apr-19	5.7	<0.01	<0.01	<0.01	<0.01	<0.01
	25-Apr-19	7.8	0.010	<0.01	<0.01	<0.01	<0.01
	02-May-19	11.5	<0.01	<0.01	<0.01	<0.01	<0.01
	13-May-19	17.2	<0.01	<0.01	<0.01	<0.01	<0.01
	22-May-19	32.0	<0.01	<0.01	<0.01	<0.01	<0.01
Ethene	5-Apr-19	0.0	<0.01	--	--	--	--
	10-Apr-19	2.4	<0.01	0.04	0.04	0.03	0.03
	18-Apr-19	5.7	<0.01	0.02	0.05	0.05	0.05
	25-Apr-19	7.8	<0.01	0.04	0.02	0.05	0.16
	02-May-19	11.5	<0.01	0.02	0.02	0.03	0.05
	13-May-19	17.2	<0.01	<0.01	0.02	0.02	0.03
	22-May-19	32.0	<0.01	0.01	0.02	0.03	0.04
Ethane	5-Apr-19	0.0	<0.01	--	--	--	--
	10-Apr-19	2.4	<0.01	0.02	0.01	0.01	0.01
	18-Apr-19	5.7	<0.01	<0.01	0.02	0.02	0.02
	25-Apr-19	7.8	<0.01	0.02	0.01	0.03	0.10
	02-May-19	11.5	<0.01	<0.01	0.01	0.01	0.03
	13-May-19	17.2	<0.01	<0.01	<0.01	<0.01	<0.01
	22-May-19	32.0	<0.01	<0.01	<0.01	<0.01	0.01
Methane	5-Apr-19	0.0	<0.05	--	--	--	--
	10-Apr-19	2.4	<0.05	<0.05	<0.05	<0.05	<0.05
	18-Apr-19	5.7	<0.05	<0.05	<0.05	<0.05	<0.05
	25-Apr-19	7.8	<0.05	<0.05	<0.05	<0.05	0.05
	02-May-19	11.5	<0.05	<0.05	<0.05	<0.05	0.05
	13-May-19	17.2	<0.05	<0.05	<0.05	<0.05	0.05
	22-May-19	32.0	<0.05	<0.05	<0.05	<0.05	0.05

Notes:

-- - not applicable
% - percent
< - not detected, the associated value is quantitation limit
cDCE - cis-1,2-dichloroethene
cVOC - chlorinated volatile organic compound
DHG - dissolved hydrocarbon gasses
ft - feet
mg/L - milligrams per liter
mZVI - micro-scale zero valent iron
PV - pore volumes
TCE - trichloroethene
VC - vinyl chloride

TABLE 5
WATER SAMPLE cVOC AND DHG RESULTS - 100% gZVI COLUMN
Time Oil, Seattle, WA

			Influent	Port A	Port B	Port C	Port D	Port E	Port F	Port G	Effluent
Column Distance (ft)			**0.0**	**0.08**	**0.16**	**0.33**	**0.50**	**0.66**	**1.00**	**1.31**	**1.64**
Residence Time (hours)			**0.0**	**1.1**	**2.3**	**4.7**	**7.1**	**9.4**	**14.2**	**18.6**	**23.3**
Compound	Date	PV	Concentration (mg/L)								
TCE	29-Mar-19	0.0	1.27	--	--	--	--	--	--	--	--
	10-Apr-19	8.9	1.38	0.61	0.30	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	18-Apr-19	15.9	1.25	0.67	0.35	0.03	<0.01	<0.01	<0.01	<0.01	<0.01
	25-Apr-19	22.8	1.11	0.53	0.36	0.06	0.01	<0.01	0.01	<0.01	<0.01
	02-May-19	29.4	1.15	0.61	0.38	0.10	0.03	<0.01	0.01	<0.01	<0.01
	13-May-19	39.1	1.02	0.69	0.49	0.14	0.07	0.03	<0.01	<0.01	0.01
	22-May-19	47.7	1.05	0.73	0.57	0.21	0.09	0.05	<0.01	<0.01	<0.01
cDCE	29-Mar-19	0.0	0.09	--	--	--	--	--	--	--	--
	10-Apr-19	8.9	0.09	0.09	0.08	0.03	<0.01	<0.01	<0.01	<0.01	<0.01
	18-Apr-19	15.9	0.09	0.08	0.08	0.04	0.01	<0.01	<0.01	<0.01	<0.01
	25-Apr-19	22.8	0.09	0.07	0.07	0.04	0.03	0.01	<0.01	<0.01	<0.01
	02-May-19	29.4	0.09	0.07	0.07	0.06	0.05	0.02	0.01	<0.01	<0.01
	13-May-19	39.1	0.08	0.08	0.08	0.07	0.07	0.06	0.04	0.02	<0.01
	22-May-19	47.7	0.08	0.08	0.08	0.09	0.08	0.07	0.05	0.04	<0.01
VC	29-Mar-19	0.0	<0.01	--	--	--	--	--	--	--	--
	10-Apr-19	8.9	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	18-Apr-19	15.9	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	25-Apr-19	22.8	0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	02-May-19	29.4	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	13-May-19	39.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	22-May-19	47.7	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ethene	29-Mar-19	0.0	<0.01	--	--	--	--	--	--	--	--
	10-Apr-19	8.9	<0.01	0.05	0.08	0.09	0.06	0.06	0.04	0.03	0.02
	18-Apr-19	15.9	<0.01	0.05	0.08	0.08	0.06	0.05	0.04	0.03	0.01
	25-Apr-19	22.8	<0.01	0.04	0.06	0.05	0.05	0.05	0.03	0.03	<0.01
	02-May-19	29.4	<0.01	0.03	0.05	0.06	0.06	0.05	0.04	0.03	0.01
	13-May-19	39.1	<0.01	0.02	0.04	0.05	0.06	0.05	0.05	0.04	0.02
	22-May-19	47.7	<0.01	0.02	0.03	0.05	0.05	0.06	0.06	0.05	0.04
Ethane	29-Mar-19	0.0	<0.01	--	--	--	--	--	--	--	--
	10-Apr-19	8.9	<0.01	0.02	0.04	0.07	0.08	0.11	0.14	0.14	0.13
	18-Apr-19	15.9	<0.01	0.02	0.05	0.07	0.08	0.09	0.12	0.14	0.17
	25-Apr-19	22.8	<0.01	0.02	0.04	0.05	0.09	0.10	0.10	0.12	0.14
	02-May-19	29.4	<0.01	0.02	0.04	0.05	0.08	0.12	0.12	0.12	0.16
	13-May-19	39.1	<0.01	0.01	0.03	0.04	0.06	0.06	0.08	0.07	0.10
	22-May-19	47.7	<0.01	0.01	0.02	0.04	0.05	0.06	0.07	0.08	0.12
Methane	29-Mar-19	0.0	<0.05	--	--	--	--	--	--	--	--
	10-Apr-19	8.9	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	18-Apr-19	15.9	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	25-Apr-19	22.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	02-May-19	29.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	13-May-19	39.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	22-May-19	47.7	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:

-- - not applicable
< - not detected, the associated value is quantitation limit
cDCE - cis-1,2-dichloroethene
cVOC - chlorinated volatile organic compounds
DHG - dissolved hydrocarbon gasses
ft - feet
gZVI - granular zero valent iron
mg/L - milligrams per liter
PV - pore volumes
TCE - trichloroethene
VC - vinyl chloride

TABLE 6
WATER SAMPLE BTEX AND PHC RESULTS
Time Oil, Seattle, WA

Compound	Date	Influent	Effluent		
			Control Column	1% mZVI Column	100% gZVI Column
		Concentration (µg/L)			
Benzene	29-Mar-19	<0.50	--	--	--
	10-Apr-19	<0.50	0.50	<0.50	18.3
	18-Apr-19	<0.50	<0.50	<0.50	0.71
	25-Apr-19	<0.50	<0.50	<0.50	0.73
	2-May-19	<0.50	<0.50	<0.50	0.52
	22-May-19	<0.50	<0.50	<0.50	0.51
Ethylbenzene	29-Mar-19	<0.50	--	--	--
	10-Apr-19	<0.50	<0.50	<0.50	<0.50
	18-Apr-19	<0.50	<0.50	<0.50	<0.50
	25-Apr-19	<0.50	<0.50	<0.50	<0.50
	2-May-19	<0.50	<0.50	<0.50	<0.50
	22-May-19	<0.50	<0.50	<0.50	<0.50
Toluene	29-Mar-19	<0.50	--	--	--
	10-Apr-19	<0.50	<0.50	<0.50	0.5
	18-Apr-19	<0.50	<0.50	<0.50	0.76
	25-Apr-19	<0.50	<0.50	<0.50	0.66
	2-May-19	<0.50	<0.50	<0.50	<0.50
	22-May-19	<0.50	<0.50	<0.50	0.57
o-Xylene	29-Mar-19	<0.30	--	--	--
	10-Apr-19	<0.30	<0.30	<0.30	<0.30
	18-Apr-19	<0.30	<0.30	<0.30	<0.30
	25-Apr-19	<0.30	<0.30	<0.30	<0.30
	2-May-19	<0.30	<0.30	<0.30	<0.30
	22-May-19	<0.30	<0.30	<0.30	<0.30
m+p-Xylenes	29-Mar-19	<0.40	--	--	--
	10-Apr-19	<0.40	<0.40	<0.40	<0.40
	18-Apr-19	<0.40	<0.40	<0.40	<0.40
	25-Apr-19	<0.40	<0.40	<0.40	<0.40
	2-May-19	<0.40	<0.40	<0.40	<0.40
	22-May-19	<0.40	<0.40	<0.40	<0.40
Xylenes (Total)	29-Mar-19	<0.50	--	--	--
	10-Apr-19	<0.50	<0.50	<0.50	<0.50
	18-Apr-19	<0.50	<0.50	<0.50	<0.50
	25-Apr-19	<0.50	<0.50	<0.50	<0.50
	2-May-19	<0.50	<0.50	<0.50	<0.50
	22-May-19	<0.50	<0.50	<0.50	<0.50
F1 (C6-C10)	29-Mar-19	283	--	--	--
	10-Apr-19	203	92	<25	<25
	18-Apr-19	222	95	<25	<25
	25-Apr-19	234	88	<25	<25
	2-May-19	339	167	26	<25
	22-May-19	196	90	<25	<25
F1-BTEX	29-Mar-19	283	--	--	--
	10-Apr-19	203	91	<25	<25
	18-Apr-19	222	95	<25	<25
	25-Apr-19	234	88	<25	<25
	2-May-19	339	167	26	<25
	22-May-19	196	90	<25	<25
F2 (C10-C16)	29-Mar-19	<100	--	--	--
	10-Apr-19	<100	<100	<100	<100
	18-Apr-19	<100	110	110	130
	25-Apr-19	<100	<100	<100	<100
	2-May-19	<100	<100	<100	<100
	22-May-19	<100	<100	<100	<100
F3 (C16-C34)	29-Mar-19	<250	--	--	--
	10-Apr-19	<250	<250	<250	<250
	18-Apr-19	<250	420	580	310
	25-Apr-19	<250	<250	<250	<250
	2-May-19	<250	<250	<250	<250
	22-May-19	<250	<250	<250	<250
F4 (C34-C50)	29-Mar-19	<250	--	--	--
	10-Apr-19	<250	<250	<250	<250
	18-Apr-19	<250	<250	<250	<250
	25-Apr-19	<250	<250	<250	<250
	2-May-19	<250	<250	<250	<250
	22-May-19	<250	<250	<250	<250
Total Hydrocarbons (C6-C50)	29-Mar-19	<370	--	--	--
	10-Apr-19	<370	<370	<370	<370
	18-Apr-19	<370	630	690	440
	25-Apr-19	<370	<370	<370	<370
	2-May-19	<370	<370	<370	<370
	22-May-19	<370	<370	<370	<370

Notes:

-- - not applicable
% - percent
< - not detected, the associated value is quantitation limit
BTEX - benzene, ethyl benzene, toluene, xylene
cDCE - cis-1,2-dichloroethene
cVOC - chlorinated volatile organic compounds
gZVI - granular zero valent iron
m+p-xylenes - *meta* +*para* -xylene
mg/L - milligrams per liter
mZVI - micro-scale zero valent iron
o-xylene - *ortho* -xylenes
PHC - petroleum hydrocarbons (Fractions F1 -F4)

TABLE 7
ZVI Solid Analyses of BTEX Compounds
Time Oil, Seattle, WA

Compound	Date	Granular ZVI	
		S#2229-1	S#2229-2
		ug/g	
Benzene	16-Jul-19	0.013	0.015
Ethylbenzene		<0.018	0.019
Toluene		0.160	0.200
o-Xylene		0.021	0.025
m+p-Xylenes		0.055	0.065
Xylenes (Total)		0.075	0.090
F1 (C6-C10)		<5.0	<5.0
F1-BTEX		<5.0	<5.0
F2 (C10-C16)		<10	<10
F3 (C16-C34)		<50	<50
F4 (C34-C50)		<50	<50
Total Hydrocarbons (C6-C50)		<72	<72

Notes:

< - not detected, the associated value is quantitation limit
BTEX - benzene, ethyl benzene, toluene, xylene
gZVI - granular zero valent iron
m+p-xylenes - *meta* +*para* -xylene
µg/L - micrograms per liter
o-xylene - *ortho* -xylenes

TABLE 8
CALCULATED cVOC HALF-LIFE VALUES
Time Oil, Seattle, WA

Compound	Pore Volume	Influent Concentration (mg/L)	Half-life[a] (hours)	Molar Conversion Rate (Molar %)	r^2
1% mZVI Column					
TCE	11.5	1.15	2.2	--	0.997
	17.2	1.02	2.3	--	0.999
	32.0	1.05	1.8	--	0.999
cDCE				TCE → cDCE	
	11.5	0.09	88	5%	0.934
	17.2	0.08	157		0.945
	32.0	0.08	128		0.947
100% gZVI Column					
TCE	29.4	1.15	1.3	--	0.999
	39.1	1.02	1.9	--	0.996
	47.7	1.05	2.2	--	0.995
cDCE				TCE → cDCE	
	29.4	0.09	4.8	1.5%	0.934
	39.1	0.08	7.9	3.0%	0.909
	47.7	0.08	8.3	6.7%	0.866

Notes:

[a] Half-life calculated based on test temperature of 22°C
-- - not applicable
% - percent
cDCE - cis-1,2-dichloroethene
cVOC - chlorinated volatile organic compounds
ft/day - feet per day
mg/L - milligrams per liter
r^2 - coefficient of determination
TCE - trichloroethene
gZVI - granular zero valent iron
mZVI - micro-scale zero valent iron

TABLE 9
WATER SAMPLE pH, ORP AND ANION RESULTS - CONTROL COLUMN
Time Oil, Seattle, WA

			Influent	Effluent
Column Distance (ft)			**0.0**	**1.64**
Residence Time (hours)			**0.0**	**39.8**
Compound	Date	PV	Concentration (mg/L)	
pH	29-Mar-19	0.0	6.71	--
	10-Apr-19	6.9	7.00	6.80
	18-Apr-19	11.3	7.25	7.00
	25-Apr-19	15.6	7.22	6.81
	02-May-19	20.3	7.09	6.94
	13-May-19	27.0	7.18	6.91
	22-May-19	32.0	7.23	6.94
ORP (mV)	29-Mar-19	0.0	146	--
	10-Apr-19	6.9	5	42
	18-Apr-19	11.3	134	54
	25-Apr-19	15.6	92	58
	02-May-19	20.3	118	90
	13-May-19	27.0	156	138
	22-May-19	32.0	75	136
Chloride (mg/L)	29-Mar-19	0.0	3.8	--
	10-Apr-19	6.9	5.4	4.7
	25-Apr-19	15.6	7.7	6.2
	22-May-19	32.0	4.7	5.1
Nitrate-Nitrogen (mg/L)	29-Mar-19	0	<0.09	--
	10-Apr-19	6.9	<0.09	<0.09
	25-Apr-19	15.6	<0.09	<0.09
	22-May-19	32.0	<0.09	<0.09
Nitrite-Nitrogen (mg/L)	29-Mar-19	0.0	<0.09	--
	10-Apr-19	6.9	<0.09	<0.09
	25-Apr-19	15.6	<0.09	<0.09
	22-May-19	32.0	<0.09	<0.09
Sulfate (mg/L)	29-Mar-19	0.0	10.3	--
	10-Apr-19	6.9	14	22
	25-Apr-19	15.6	23	24
	22-May-19	32.0	12	15
Phosphate (mg/L)	29-Mar-19	0.0	<0.07	--
	10-Apr-19	6.9	<0.07	<0.07
	25-Apr-19	15.6	<0.07	<0.07
	22-May-19	32.0	<0.07	<0.07

Notes:

-- - not applicable
< - not detected, associated value is the quantitation limit
ft - feet
mg/L - milligrams per liter
mV - millivolts
ORP - oxidation-reduction potential
PV - pore volumes
ZVI - zero valent iron

TABLE 10
WATER SAMPLE pH, ORP AND ANION RESULTS - 1% mZVI COLUMN
Time Oil, Seattle, WA

			Influent	Port B	Port D	Port G	Effluent
Column Distance (ft)			**0.0**	**0.16**	**0.50**	**1.31**	**1.64**
Residence Time (hours)			**0.0**	**4.3**	**13.5**	**35.5**	**44.4**
Compound	Date	PV	Concentration (mg/L)				
pH	5-Apr-19	0.0	6.71	--	--	--	--
	10-Apr-19	2.4	7.00	6.73	6.62	6.67	6.78
	18-Apr-19	5.7	7.25	7.24	7.05	6.97	7.19
	25-Apr-19	7.8	7.22	6.97	7.28	7.30	7.18
	02-May-19	11.5	7.09	7.20	7.39	7.67	7.66
	13-May-19	17.2	7.26	7.28	7.56	7.71	7.69
	22-May-19	22.1	7.25	7.27	7.56	7.80	7.95
ORP (mV)	5-Apr-19	0.0	146	--	--	--	--
	10-Apr-19	2.4	5	-18	-95	-68	-39
	18-Apr-19	5.7	134	-48	-222	-445	-333
	25-Apr-19	7.8	92	-111	-80	-58	-40
	02-May-19	11.5	118	-78	-53	-17	22
	13-May-19	17.2	156	71	98	110	113
	22-May-19	22.1	123	-51	-53	64	22
Chloride (mg/L)	5-Apr-19	0.0	3.8	--	--	--	--
	10-Apr-19	2.4	5.4	5.2	8.8	7.7	7.8
	25-Apr-19	7.8	7.7	7.1	8.6	9.5	8.1
	22-May-19	22.1	4.7	4.3	4.5	4.7	6.8
Nitrate-Nitrogen (mg/L)	5-Apr-19	0.0	<0.09	--	--	--	--
	10-Apr-19	2.4	<0.09	<0.09	<0.09	<0.09	<0.09
	25-Apr-19	7.8	<0.09	<0.09	2.2	<0.09	<0.09
	22-May-19	22.1	<0.09	<0.09	<0.09	<0.09	<0.09
Nitrite-Nitrogen (mg/L)	5-Apr-19	0.0	<0.09	--	--	--	--
	10-Apr-19	2.4	<0.09	<0.09	<0.09	<0.09	<0.09
	25-Apr-19	7.8	<0.09	<0.09	<0.09	<0.09	<0.09
	22-May-19	22.1	<0.09	<0.09	<0.09	<0.09	<0.09
Sulfate (mg/L)	5-Apr-19	0.0	10	--	--	--	--
	10-Apr-19	2.4	14	12	14	14	12
	25-Apr-19	7.8	23	20	15	11	<0.07
	22-May-19	22.1	12	6.6	3.4	<0.07	<0.07
Phosphate (mg/L)	5-Apr-19	0.0	<0.07	--	--	--	--
	10-Apr-19	2.4	<0.07	<0.07	<0.07	<0.07	<0.07
	25-Apr-19	7.8	<0.07	<0.07	<0.07	<0.07	<0.07
	22-May-19	22.1	<0.07	<0.07	<0.07	<0.07	<0.07

Notes:

-- - not applicable
< - not detected, associated value is quantitation limit
ft - feet
mg/L - milligrams per liter
mV - millivolts
mZVI - micro-scale zero valent iron
ORP - oxidation-reduction potential
PV - pore volumes
ZVI - zero valent iron

TABLE 11
WATER SAMPLE pH, ORP AND ANION RESULTS - 100% gZVI COLUMN
Time Oil, Seattle, WA

			Influent	Port A	Port B	Port C	Port D	Port E	Port F	Port G	Effluent
Column Distance (ft)			**0.0**	**0.08**	**0.16**	**0.33**	**0.50**	**0.66**	**1.00**	**1.31**	**1.64**
Residence Time (hours)			**0.0**	**1.1**	**2.3**	**4.7**	**7.1**	**9.4**	**14.2**	**18.6**	**23.3**
Compound	Date	PV	Concentration (mg/L)								
pH	29-Mar-19	0.0	6.71	--	--	--	--	--	--	--	--
	10-Apr-19	8.9	7.00	7.90	8.25	8.48	8.19	8.24	7.95	7.29	6.75
	18-Apr-19	15.9	7.15	8.02	8.52	8.87	8.88	8.71	8.75	8.39	7.57
	25-Apr-19	22.8	7.22	8.10	8.42	8.86	8.89	8.92	8.83	8.71	8.18
	02-May-19	29.4	7.09	7.90	8.14	8.65	8.80	8.92	8.79	8.85	8.91
	13-May-19	39.1	7.26	7.87	8.50	8.65	9.18	9.21	9.28	9.19	9.06
	22-May-19	47.7	7.31	7.94	8.58	9.13	9.28	9.39	9.39	9.34	9.33
ORP (mV)	29-Mar-19	0.0	146	--	--	--	--	--	--	--	--
	10-Apr-19	8.9	5	-158	-132	-32	-116	-110	-92	-85	41
	18-Apr-19	15.9	45	-101	-151	-104	-112	-182	-197	-56	-15
	25-Apr-19	22.8	92	-106	-153	-105	-232	-137	-211	-216	-53
	02-May-19	29.4	118	-117	-186	-221	-224	-216	-256	-147	-59
	13-May-19	39.1	156	-75	-154	34	-109	-136	-192	-114	-89
	22-May-19	47.7	150	-104	-85	-16	-41	-207	-168	-181	-38
Chloride (mg/L)	29-Mar-19	0.00	3.76	--	--	--	--	--	--	--	--
	10-Apr-19	8.9	4.3	6.1	8.1	6.1	7.2	7.3	6.7	6.7	9.5
	25-Apr-19	22.8	7.7	7.1	7.1	7.9	7.5	9.5	10	8.7	10
	22-May-19	47.7	4.7	4.2	5.2	4.7	5.3	4.8	5.7	6.0	5.9
Nitrate-Nitrogen (mg/L)	29-Mar-19	0.0	<0.09	--	--	--	--	--	--	--	--
	10-Apr-19	8.9	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
	25-Apr-19	22.8	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
	22-May-19	47.7	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Nitrite-Nitrogen (mg/L)	29-Mar-19	0.0	<0.09	--	--	--	--	--	--	--	--
	10-Apr-19	8.9	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
	25-Apr-19	22.8	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
	22-May-19	47.7	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Sulfate (mg/L)	29-Mar-19	0.0	10	--	--	--	--	--	--	--	--
	10-Apr-19	8.9	12	12	15	14	17	19	23	33	38
	25-Apr-19	22.8	23	15	18	13	12	14	13	21	46
	22-May-19	47.7	12	12	7.2	1.4	<0.07	1.4	0.69	<0.07	<0.07
Phosphate (mg/L)	29-Mar-19	0.0	<0.07	--	--	--	--	--	--	--	--
	10-Apr-19	8.9	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
	25-Apr-19	22.8	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
	22-May-19	47.7	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07

Notes:

-- - not applicable
< - not detected, associated value is quantitation limit
ft - feet
gZVI - granular zero valent iron
mg/L - milligrams per liter
mV - millivolts
ORP - oxidation-reduction potential
PV - pore volumes
ZVI - zero valent iron

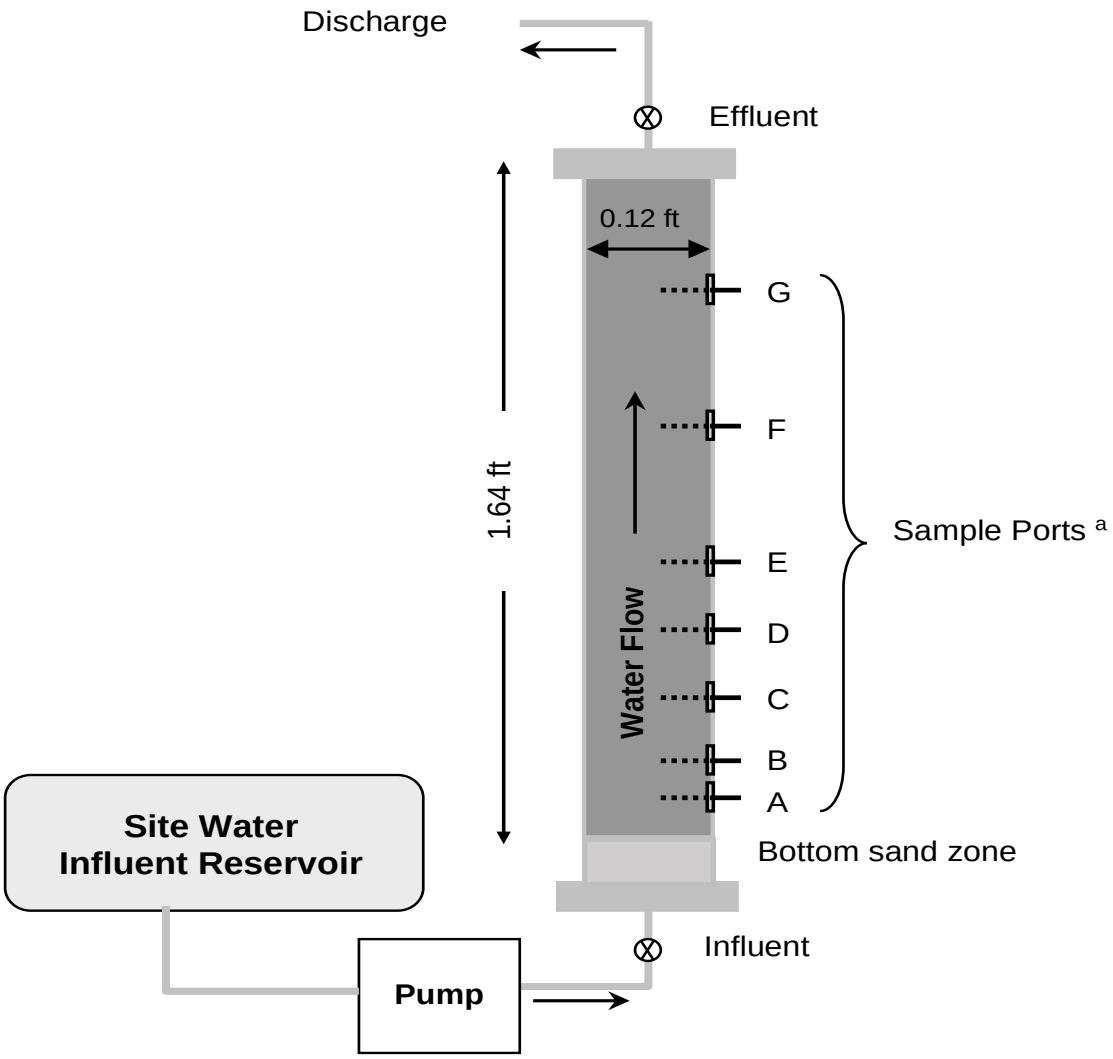
TABLE 12
WATER SAMPLE CATION and ALKALINITY RESULTS
Time Oil, Seattle, WA

Analysis / Sample ID	Units	Baseline Samples	Endpoint Samples			
			Influent	Effluent - Control Column	Effluent - 1% mZVI Column	Effluent - 100% gZVI Column
Sample Date		**29-Mar-19**	**23-May-19**	**23-May-19**	**23-May-19**	**23-May-19**
Alkalinity	mg/L as $CaCO_3$	170	182	160	192	91
Total Organic Carbon	mg/L	8	10	9	10	6
Total Dissolved Solids	mg/L	1770*	250	160	170	60
Calcium (total)	mg/L	27.3	26.3	27.3	27.5	6.87
Iron (total)	mg/L	0.122	0.037	0.066	0.463	0.091
Potassium (total)	mg/L	2.09	1.89	3.23	1.98	1.92
Magnesium (total)	mg/L	23.0	21.2	17.2	20.7	11.7
Manganese (total)	mg/L	0.335	0.205	1.34	0.150	0.0736
Sodium (total)	mg/L	10.3	9.26	8.93	9.11	9.20
Silicon (total)	mg/L	20.3	17.6	12.5	4.94	0.33

Notes:

% - percent
* Baseline TDS value considered an outlier based on endpoint samples.
$CaCO_3$ - calcium carbonate
gZVI - granular zero valent iron
mg/L - milligrams per liter
mZVI - micro-scale zero valent iron

FIGURES



Notes:
ft - feet
ZVI - zero valent iron
a - Control Column was sampled from infuent (In) and effluent (Eff) only,
1% mZVI Column was samled from In, Eff, and Ports B, D and G,
100% gZVI Column was sampled from In, Eff and ports A-G.

Schematic of Column Study Set Up
Time Oil, Seattle, WA

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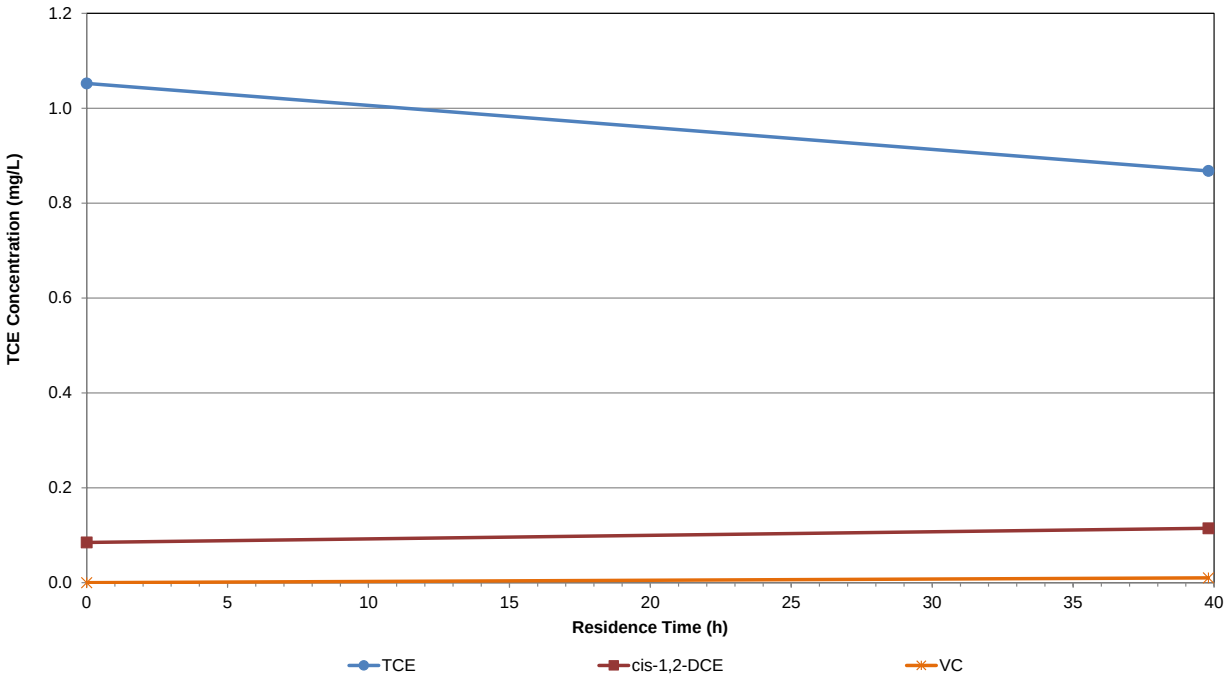
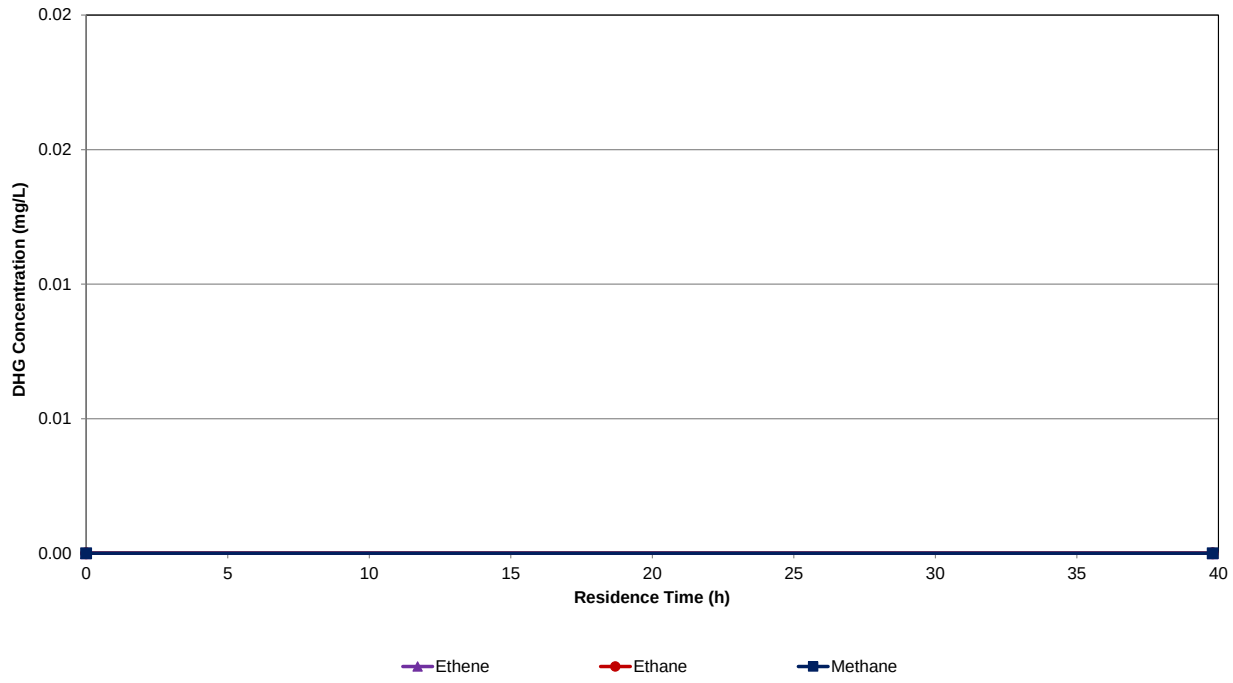
June 2019

Figure: **1**





Notes:

cDCE - cis-1,2-dichloroethene
cVOC - chlorinated volatile organic compound
DHG - dissolved hydrocarbon gases
h - hours
mg/L - milligrams per liter
TCE - trichloroethene
VC - vinyl chloride

Control Column cVOC and DHG Results
versus Residence Time at End of Study
Time Oil, Seattle, WA

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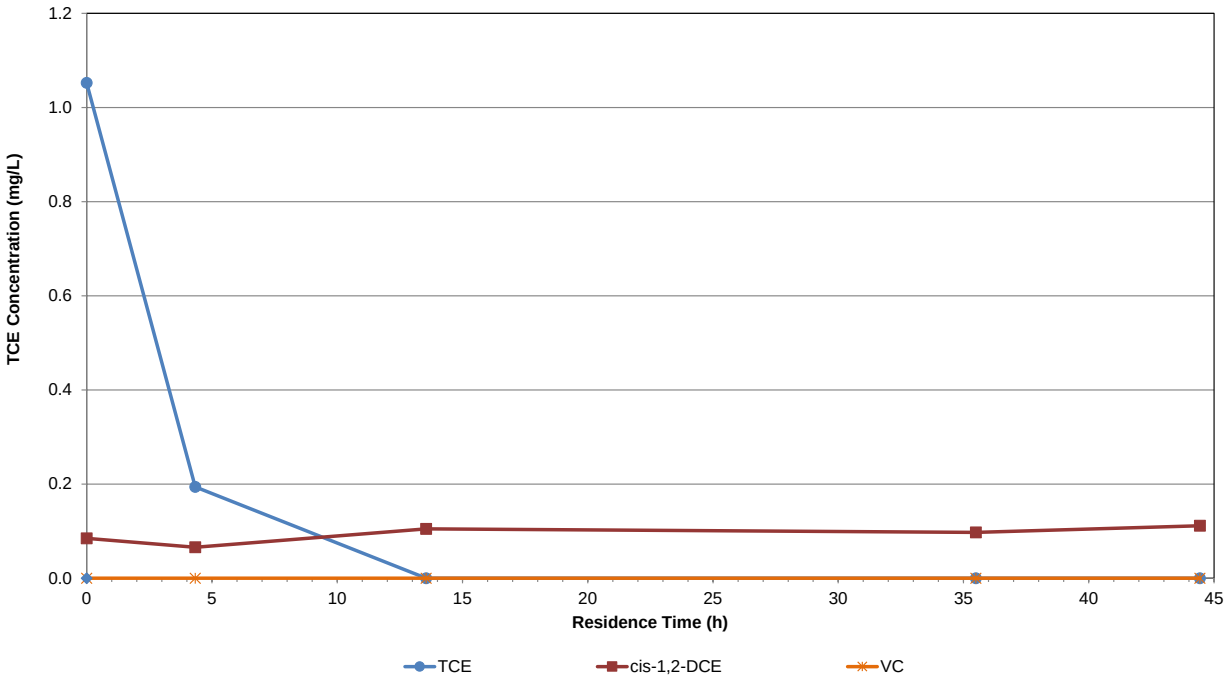
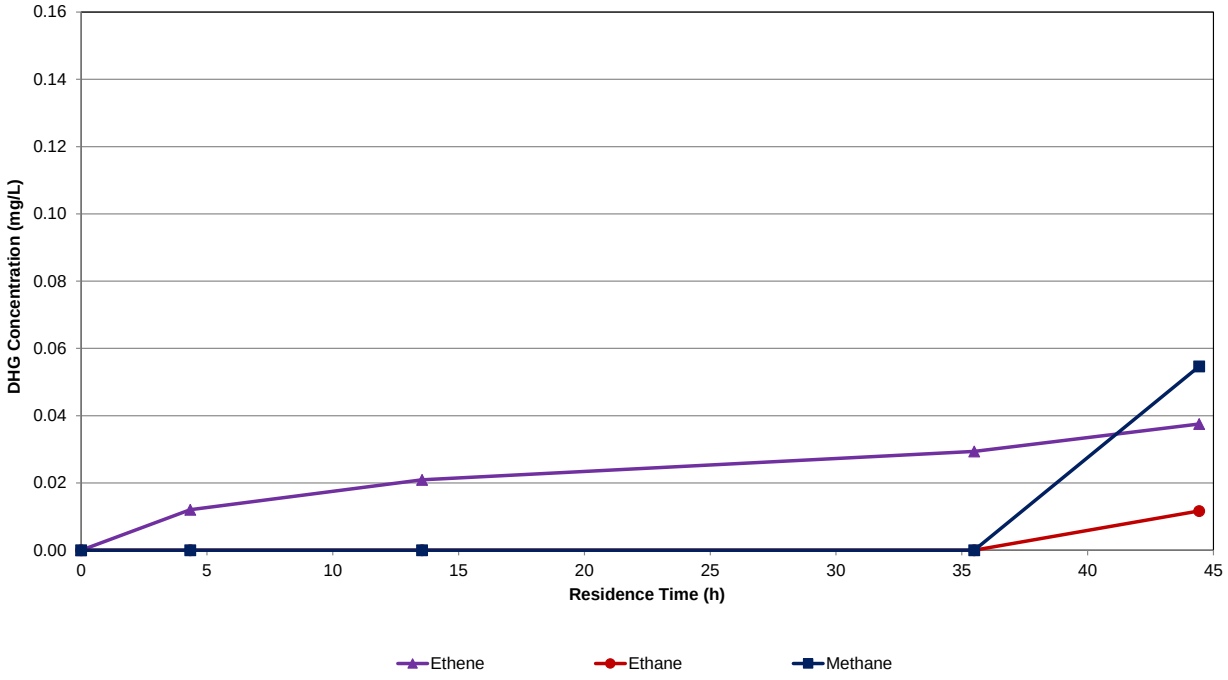
Figure: **2**





Notes:

cDCE - cis-1,2-dichloroethene
cVOC - chlorinated volatile organic compound
DHG - dissolved hydrocarbon gases
h - hours
mg/L - milligrams per liter
TCE - trichloroethene
VC - vinyl chloride

1% mZVI Column cVOC and DHG Results
versus Residence Time at End of Study
Time Oil, Seattle, WA

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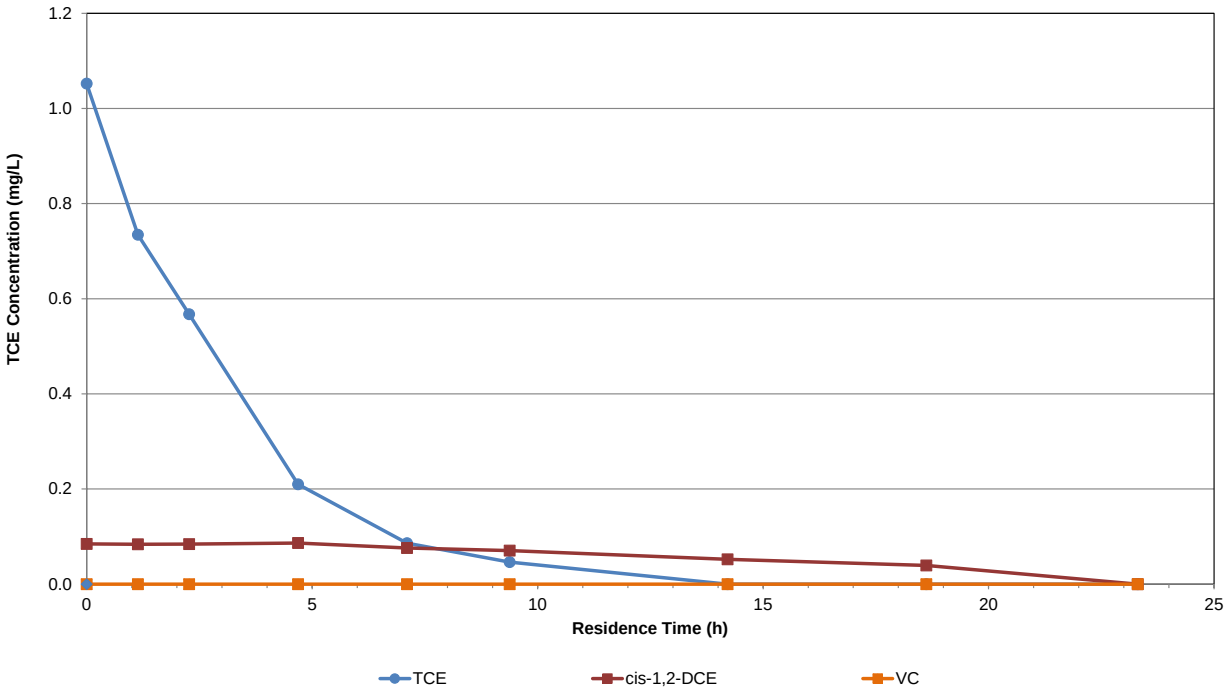
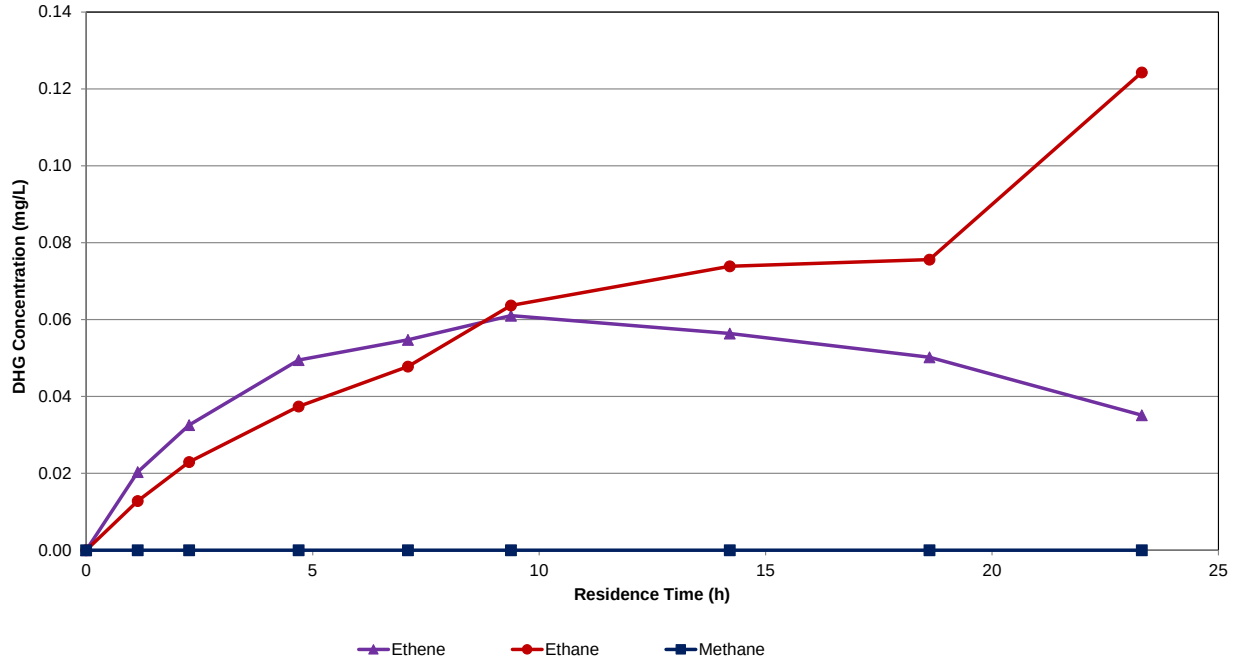
Figure: **3**





Notes:

cDCE - cis-1,2-dichloroethene
cVOC - chlorinated volatile organic compound
DHG - dissolved hydrocarbon gases
h - hours
mg/L - milligrams per liter
TCE - trichloroethene
VC - vinyl chloride

100% gZVI Column cVOC and DHG Results
versus Residence Time at End of Study
Time Oil, Seattle, WA

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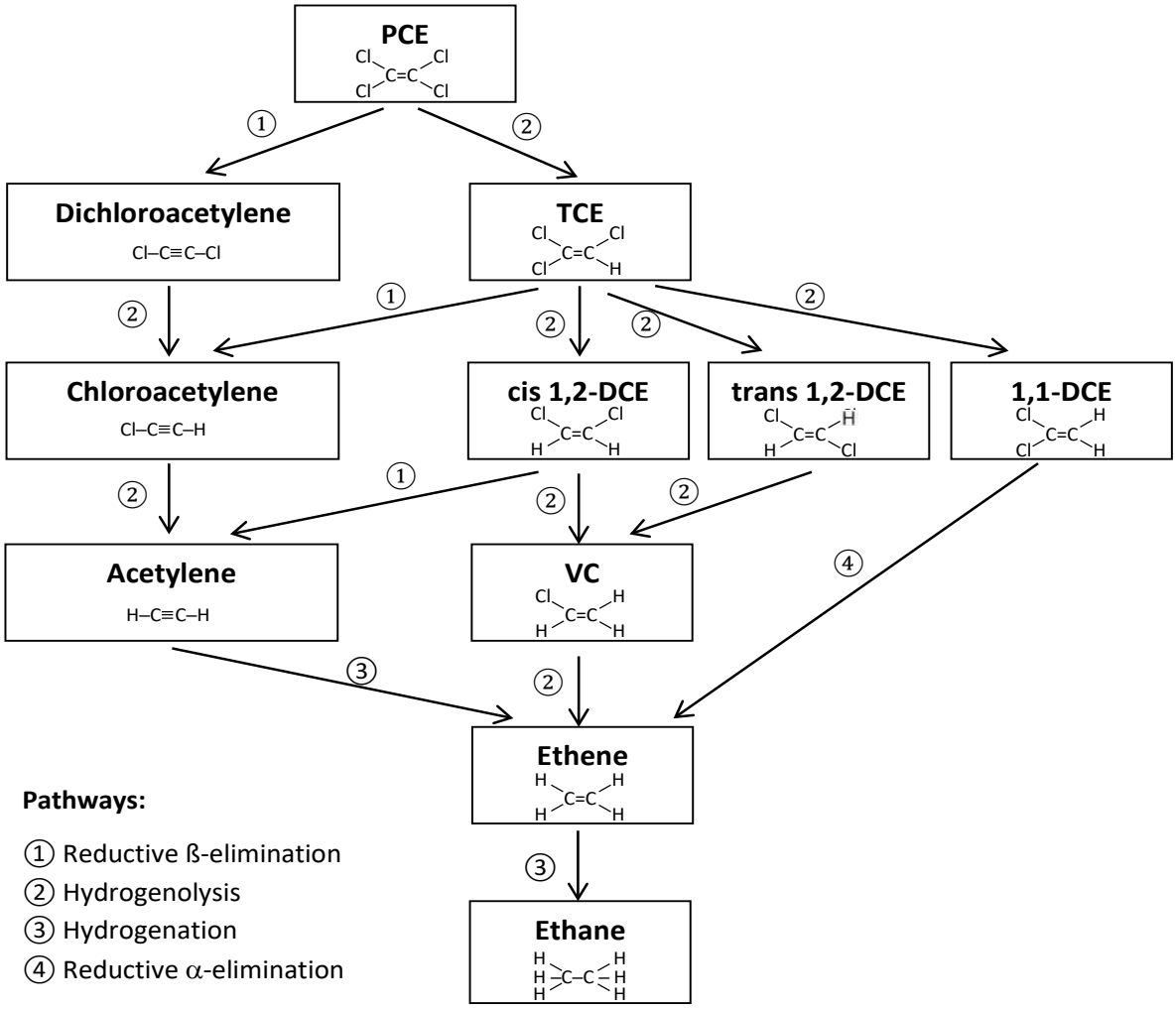
Figure: **4**



Notes:

1,1-DCE - 1,1-dichloroethene
cis 1,2-DCE - cis-1,2-dichloroethene
PCE - tetrachloroethene
TCE - trichloroethene
trans 1,2-DCE - trans-1,2-dichloroethene
VC - vinyl chloride
ZVI - zero valent iron
(modified from Arnold and Roberts, 2000)

Chlorinated Ethene Degradation Pathways with ZVI
Time Oil, Seattle, WA

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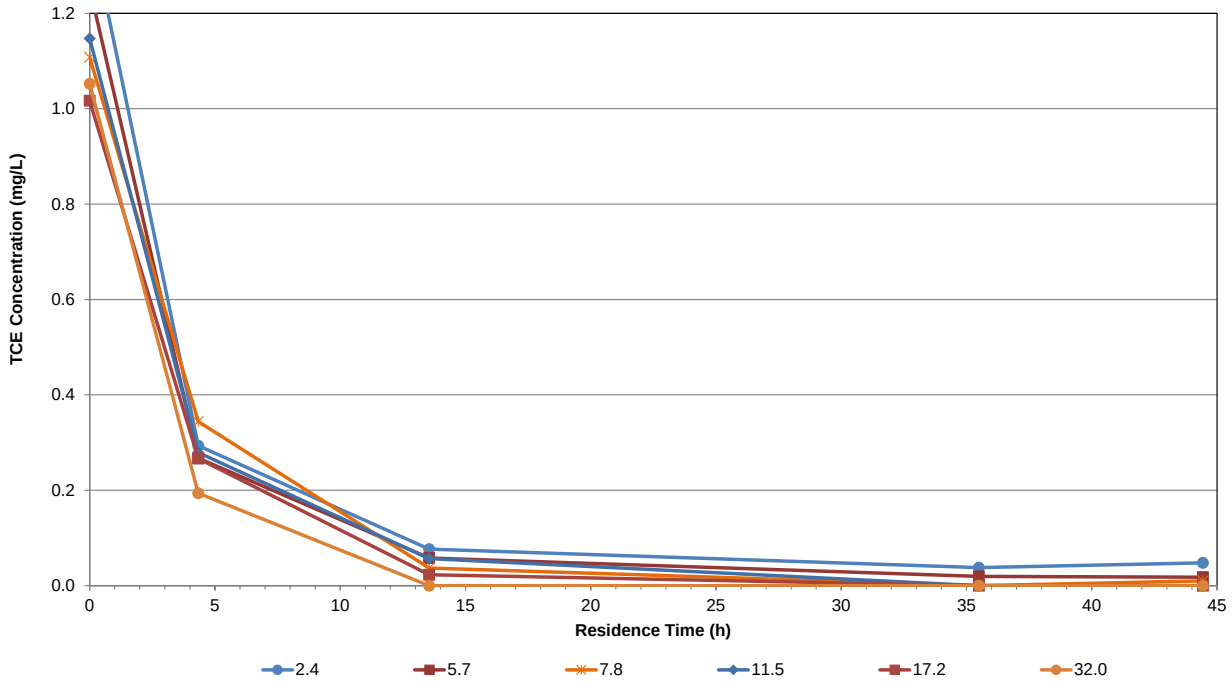
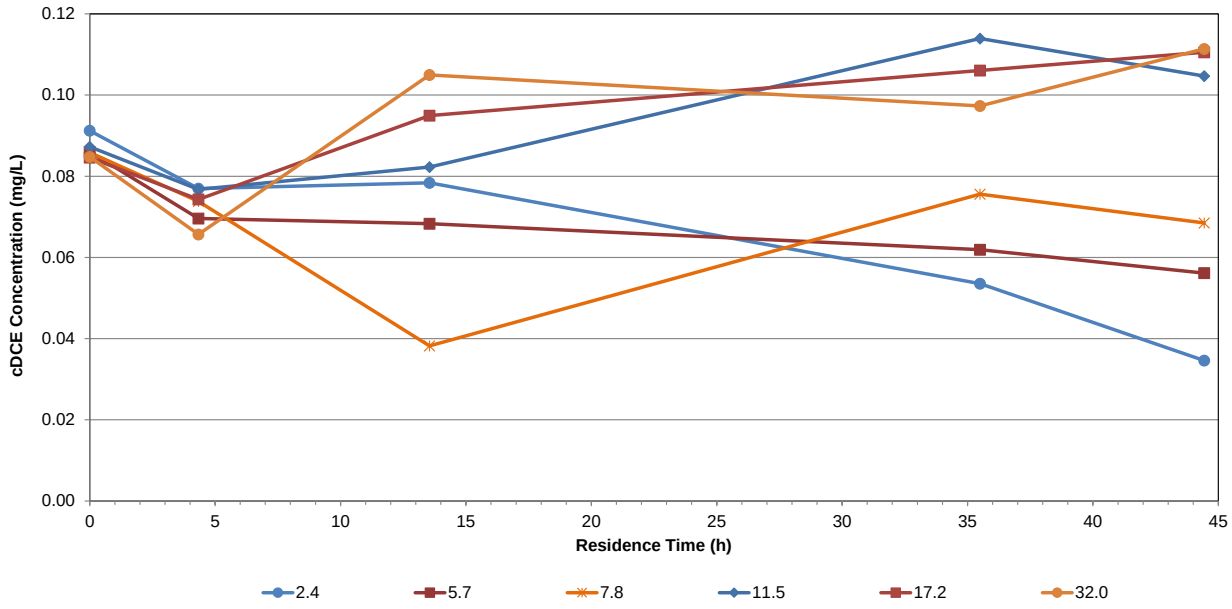
Figure: **5**





Notes:

cDCE - cis-1,2-dichloroethene
h - hours
mZVI- micro-scale ZVI
PVs - number of pore volumes passed through column
mg/L - milligrams per liter
TCE - trichloroethene

1% mZVI Column Results
Temporal Changes in TCE and cDCE Degradation
Time Oil, Seattle, WA

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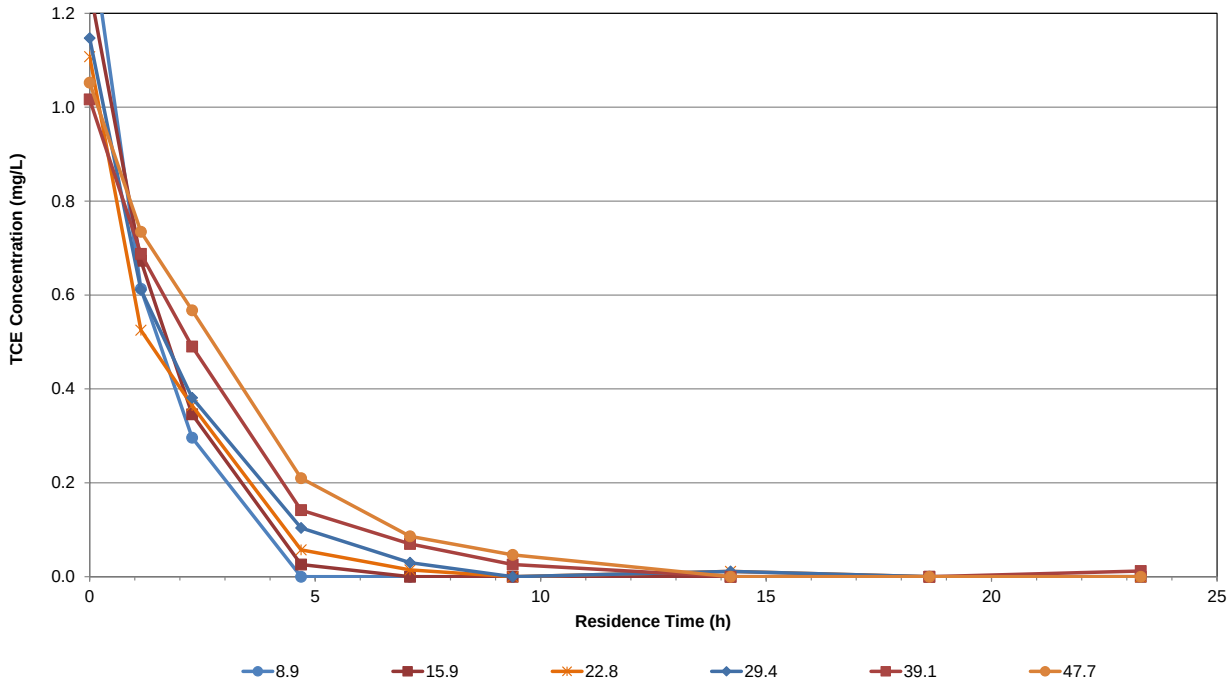
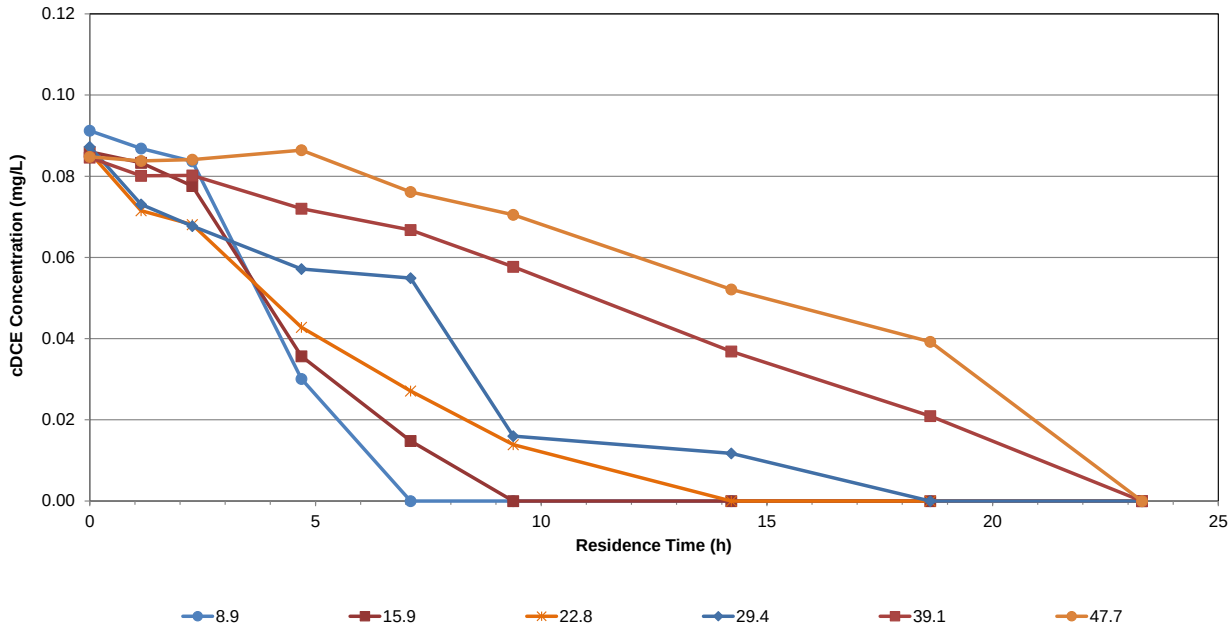
Figure: **6**





Notes:

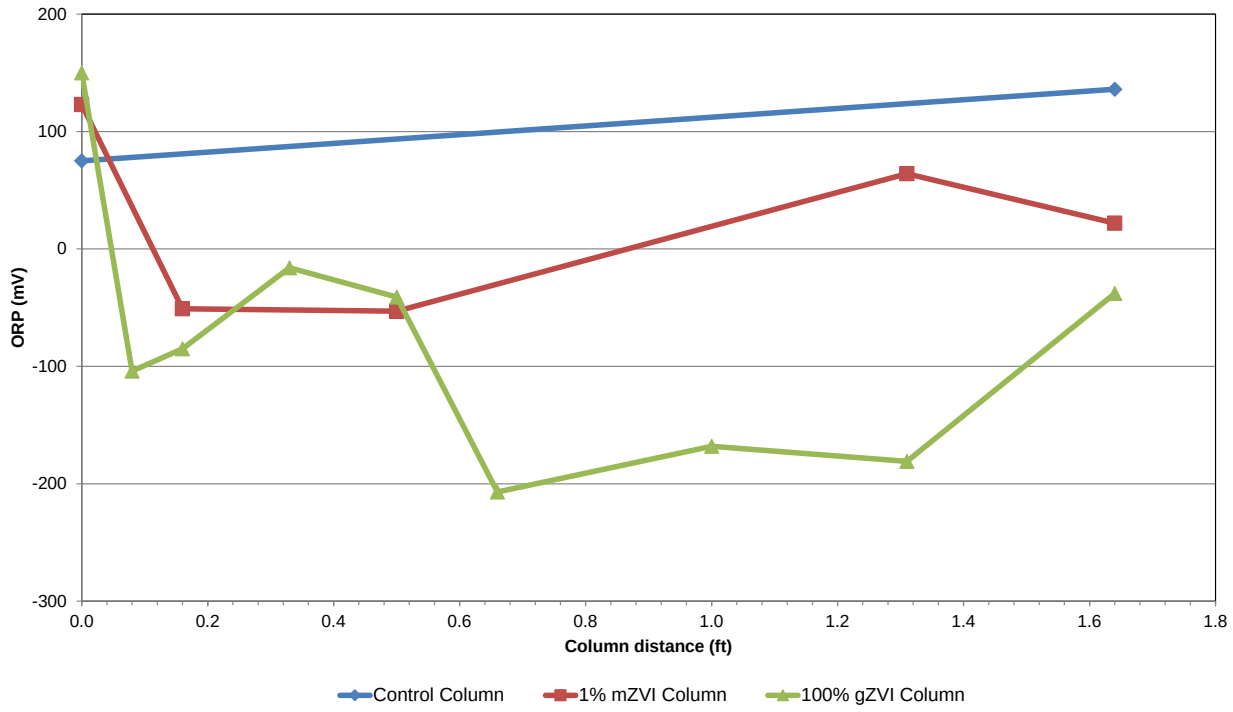
cDCE - cis-1,2-dichloroethene
h - hours
gZVI- granular ZVI
mg/L - milligrams per liter
TCE - trichloroethene
PVs - number of pore volumes passed through column

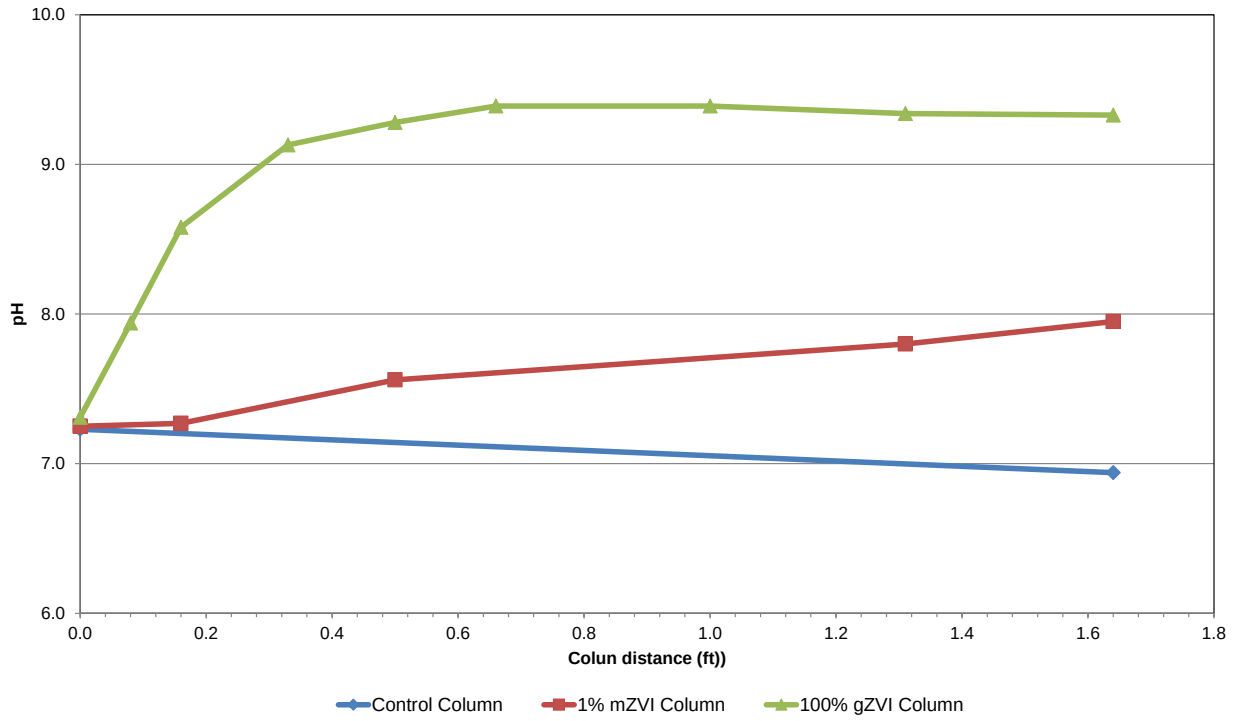
100% gZVI Column Results
Temporal Changes in TCE and cDCE Degradation
Time Oil, Seattle, WA

SiREM

June 2019

Figure: **7**





Notes:

ORP - oxidation-reduction potential
DHG - dissolved hydrocarbon gases
ft - feet
h - hours
mV - millivolts
gZVI - granular ZVI
mZVI - micro-scale ZVI

Column Water ORP and pH versus Column Length at End of Study

Time Oil, Seattle, WA

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Figure: **8**

APPENDIX A
CHAIN OF CUSTODY DOCUMENTATION

SiREM

Chain-of-Custody Form

siremlab.com

130 Stone Rd. W
Guelph, ON N1G 3Z2
(519) 822-2265

Lab # F5049

*Project Name: TIME OIL	*Project #: CHE 8384
*Project Manager: KEN MIKA	*Company: GEOSYNTEC
*Email Address: KMIKA@GEOSYNTEC.COM	
Address (Street):	
City	State/Province	Country
*Phone #: (414) 731-8111	
*Sampler's Signature	*Sampler's Printed Name: KENNETH MIKA

Client Sample ID	Sampling Date	Sampling Time	Matrix	# of Containers
01MW71 20190313001	3/13	16:45	W	7
01MW71 20190314002	3/14	9:00	W	6
TS13-02 20190314003	3/14	10:10	S	2

Analysis

Gene-Trac DHC	Gene-Trac FGA (vcrA, bvcA, tceA)	Gene-Trac DHB	Gene-Trac DHG	Gene-Trac tceA	Volatile Fatty Acids	Dissolved Hydrocarbon gases	Treatability Study				
							0				
							1				
							1				
							1				

Preservative Key
0. None
1. HCL
2. Other _____
3. Other _____
4. Other _____
5. Other _____
6. Other _____

Other Information

Billing Information	Turnaround Time Requested	For Lab Use Only	For Lab Use Only
P.O. #: CHE 8384/PHASE 2	Normal ☐	Cooler Condition: Good. (4 coolers)	Soil bags did not have ID on them.
*Bill To:	Rush ☐	Cooler Temperature: 4°C.	
		Custody Seals: Yes ☐ No ☒	Proposal #: _____

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature:	Signature:	Signature:	Signature:	Signature:	Signature:
Printed Name: KEN MIKA	Printed Name: FEDEX	Printed Name:	Printed Name: D. Nespoli	Printed Name:	Printed Name:
Firm: GEOSYNTEC	Firm:	Firm:	Firm: SiREM	Firm:	Firm:
Date/Time: 3/14 12:45	Date/Time:	Date/Time:	Date/Time: MAR 18'19 10am	Date/Time:	Date/Time:

Distribution: White - return to Originator; Yellow - Lab Copy; Pink - Retained by Client

* Mandatory Fields

APPENDIX B:
SGS LABORATORY REPORTS

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Project : Si-3965

19-April-2019

SiREM Laboratory
Attn : Rita Schofield

130 Stone Road W
Guelph, ON
N1G 3Z2, Canada

Phone: 519-822-2265
Fax:519-822-3151

Date Rec. : 02 April 2019
LR Report: **CA13006-APR19**

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: Si-3965 Influent
Sample Date & Time					29-Mar-19 12:00
Temp Upon Receipt [°C]	---	---	---	---	2.0
Alkalinity [mg/L as CaCO3]	03-Apr-19	17:12	04-Apr-19	12:12	170
TOC [mg/L]	02-Apr-19	10:00	03-Apr-19	10:52	8
Ag (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	< 0.00005
Al (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.248
As (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.0007
Ba (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.198
Be (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.000019
B (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.589
Bi (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.000072
Ca (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	27.3
Cd (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.000069
Co (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.000498
Cr (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.00078
Cu (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.0022
Fe (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.122
K (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	2.09
Li (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.0072
Mg (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	23.0
Mn (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.335
Mo (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.00065
Na (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	10.3
Ni (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.0034
Pb (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.00031
Sb (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	< 0.0009
Si (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	20.3
Se (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.00012
Sn (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	< 0.00006

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Project : Si-3965

LR Report : **CA13006-APR19**

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: Si-3965 Influent
Sr (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.160
Ti (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.00209
Tl (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.000006
U (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.000136
V (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.00068
W (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.00003
Y (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.000070
Zn (diss) [mg/L]	03-Apr-19	11:43	05-Apr-19	09:17	0.002

Catharine Arnold

Catharine Arnold, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0001721172

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

24-April-2019

SiREM Laboratory
Attn : Rita Schofield

130 Stone Road W
Guelph, ON
N1G 3Z2, Canada

Phone: 519-822-2265
Fax:519-822-3151

Date Rec. : 16 April 2019
LR Report: **CA15295-APR19**
Reference: Si-3965

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Sample ID	Sample Date & Time	Temp Upon Receipt °C	TDS mg/L
1: Analysis Start Date		---	16-Apr-19
2: Analysis Start Time		---	16:08
3: Analysis Completed Date		---	18-Apr-19
4: Analysis Completed Time		---	10:41
5: Si-3965 Influent	15-Apr-19 12:00	2.0	1770

Catharine Arnold

CHARTERED CATHARINE ARNOLD CHEMIST

Catharine Arnold, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0001725666

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Project : Si-3965

06-June-2019

SiREM Laboratory
Attn : Rita Schofield

130 Stone Road W
Guelph, ON
N1G 3Z2, Canada

Phone: 519-822-2265
Fax:519-822-3151

Date Rec. : 28 May 2019
LR Report: **CA15723-MAY19**

Copy: #1

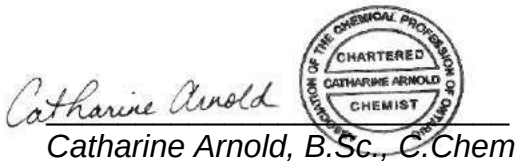
CERTIFICATE OF ANALYSIS

Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: S-5249-230519-1	6: S-5249-230519-2	7: S-5249-230519-3	8: S-5249-230519-inf
Sample Date & Time					23-May-19 16:00	23-May-19 16:00	23-May-19 16:00	23-May-19 16:00
Temp Upon Receipt [°C]	---	---	---	---	2.0	2.0	2.0	2.0
Alkalinity [mg/L as CaCO3]	29-May-19	08:22	30-May-19	15:14	160	192	91	182
TDS [mg/L]	28-May-19	15:19	30-May-19	08:39	160	170	60	250
TOC [mg/L]	28-May-19	20:30	06-Jun-19	16:34	9	10	6	10
Ca (diss) [mg/L]	29-May-19	10:51	30-May-19	15:22	27.3	27.5	6.87	26.3
Fe (diss) [mg/L]	29-May-19	10:51	30-May-19	15:22	0.066	0.463	0.091	0.037
K (diss) [mg/L]	29-May-19	10:51	30-May-19	15:22	3.23	1.98	1.92	1.89
Mg (diss) [mg/L]	29-May-19	10:51	30-May-19	15:22	17.2	20.7	11.7	21.2
Mn (diss) [mg/L]	29-May-19	10:51	30-May-19	15:22	1.34	0.150	0.0736	0.205
Na (diss) [mg/L]	29-May-19	10:51	30-May-19	15:22	8.93	9.11	9.20	9.26
Si (diss) [mg/L]	29-May-19	10:51	30-May-19	15:22	12.5	4.94	0.33	17.6

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Project : Si-3965
LR Report : **CA15723-MAY19**



Catharine Arnold, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0001774253

APPENDIX C:
ALS LABORATORY REPORTS

SIREM
ATTN: Rita Schofield
130 Stone Road West
Guelph ON N1G 3Z2

Date Received: 29-MAR-19
Report Date: 04-APR-19 14:04 (MT)
Version: FINAL

Client Phone: 519-822-2265

Certificate of Analysis

Lab Work Order #: L2251122

Project P.O. #: NOT SUBMITTED
Job Reference: SI-3965
C of C Numbers:
Legal Site Desc:

Gayle Braun
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2251122-1 SI-3965 INFLUENT 29MAR2019 Sampled By: ALICIA QUINTANILLA on 29-MAR-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		03-APR-19	R4589438
Ethylbenzene	<0.50		0.50	ug/L		03-APR-19	R4589438
Toluene	<0.50		0.50	ug/L		03-APR-19	R4589438
o-Xylene	<0.30		0.30	ug/L		03-APR-19	R4589438
m+p-Xylenes	<0.40		0.40	ug/L		03-APR-19	R4589438
Xylenes (Total)	<0.50		0.50	ug/L		03-APR-19	
Surrogate: 4-Bromofluorobenzene	98.9		70-130	%		03-APR-19	R4589438
Surrogate: 1,4-Difluorobenzene	98.9		70-130	%		03-APR-19	R4589438
Hydrocarbons							
F1 (C6-C10)	283		25	ug/L		03-APR-19	R4589438
F1-BTEX	283		25	ug/L		03-APR-19	
F2 (C10-C16)	<100		100	ug/L	01-APR-19	01-APR-19	R4588717
F3 (C16-C34)	<250		250	ug/L	01-APR-19	01-APR-19	R4588717
F4 (C34-C50)	<250		250	ug/L	01-APR-19	01-APR-19	R4588717
Total Hydrocarbons (C6-C50)	<370		370	ug/L		03-APR-19	
Chrom. to baseline at nC50	YES				01-APR-19	01-APR-19	R4588717
Surrogate: 2-Bromobenzotrifluoride	80.4		60-140	%	01-APR-19	01-APR-19	R4588717
Surrogate: 3,4-Dichlorotoluene	97.2		60-140	%		03-APR-19	R4589438

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTX-511-HS-WT	Water	BTEX by Headspace	SW846 8260 (511)

BTX is determined by analyzing by headspace-GC/MS.

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2251122 Report Date: 04-APR-19

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Water**							
Batch R4589438								
WG3016896-4 DUP		**WG3016896-3**						
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-APR-19
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-APR-19
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	03-APR-19
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	03-APR-19
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-APR-19
WG3016896-1 LCS								
Benzene			99.3		%		70-130	03-APR-19
Ethylbenzene			98.2		%		70-130	03-APR-19
m+p-Xylenes			97.1		%		70-130	03-APR-19
o-Xylene			98.0		%		70-130	03-APR-19
Toluene			101.6		%		70-130	03-APR-19
WG3016896-2 MB								
Benzene			<0.50		ug/L		0.5	03-APR-19
Ethylbenzene			<0.50		ug/L		0.5	03-APR-19
m+p-Xylenes			<0.40		ug/L		0.4	03-APR-19
o-Xylene			<0.30		ug/L		0.3	03-APR-19
Toluene			<0.50		ug/L		0.5	03-APR-19
Surrogate: 1,4-Difluorobenzene			99.3		%		70-130	03-APR-19
Surrogate: 4-Bromofluorobenzene			96.9		%		70-130	03-APR-19
WG3016896-5 MS		**WG3016896-3**						
Benzene			100.8		%		50-140	03-APR-19
Ethylbenzene			97.3		%		50-140	03-APR-19
m+p-Xylenes			96.3		%		50-140	03-APR-19
o-Xylene			96.1		%		50-140	03-APR-19
Toluene			99.4		%		50-140	03-APR-19
F1-HS-511-WT	**Water**							
Batch R4589438								
WG3016896-4 DUP		**WG3016896-3**						
F1 (C6-C10)		283	272		ug/L	3.8	30	03-APR-19
WG3016896-1 LCS								
F1 (C6-C10)			98.3		%		80-120	03-APR-19
WG3016896-2 MB								
F1 (C6-C10)			<25		ug/L		25	03-APR-19
Surrogate: 3,4-Dichlorotoluene			99.1		%		60-140	03-APR-19
WG3016896-5 MS		**WG3016896-3**						

Quality Control Report

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Water**							
Batch R4589438								
WG3016896-5 MS		**WG3016896-3**						
F1 (C6-C10)			83.9		%		60-140	03-APR-19
F2-F4-511-WT	**Water**							
Batch R4588717								
WG3018155-2 LCS								
F2 (C10-C16)			87.4		%		70-130	01-APR-19
F3 (C16-C34)			89.8		%		70-130	01-APR-19
F4 (C34-C50)			93.0		%		70-130	01-APR-19
WG3018155-1 MB								
F2 (C10-C16)			<100		ug/L		100	01-APR-19
F3 (C16-C34)			<250		ug/L		250	01-APR-19
F4 (C34-C50)			<250		ug/L		250	01-APR-19
Surrogate: 2-Bromobenzotrifluoride			68.8		%		60-140	01-APR-19

Quality Control Report

Workorder: L2251122 Report Date: 04-APR-19

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

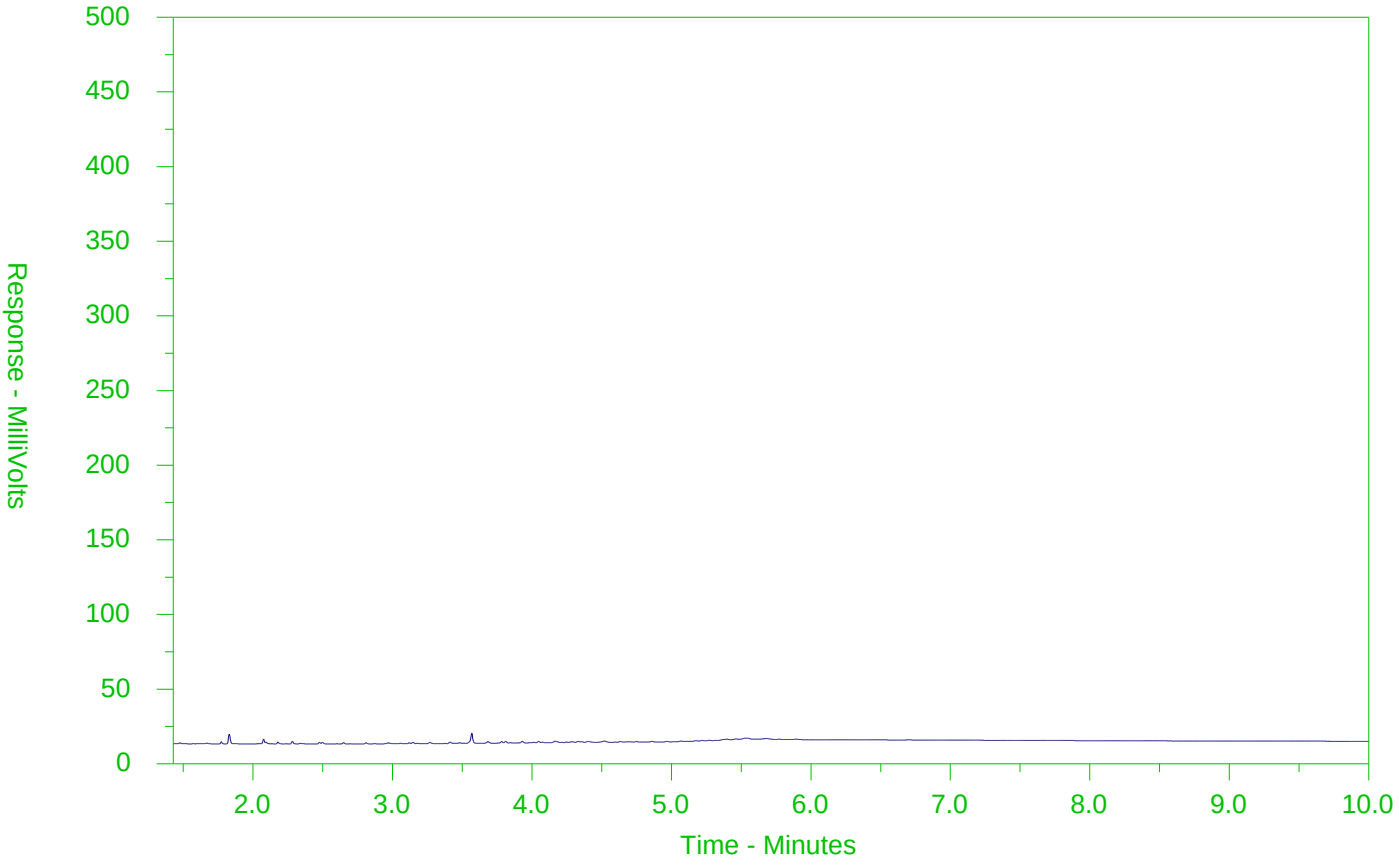
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2251122-1
Client Sample ID: SI-3965 INFLUENT 29MAR2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytic Request Form

Canada Toll Free: 1 800 668 9878

L2251122-COFC

: Number: 17 -

Page 1 of 1

Report To	Rita Schofield	Report Format / Distribution	Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)
Company:	SiREM	Select Report Format: ☑ PDF ☐ EXCEL ☑ EDD (DIGITAL)	R ☑ Regular (Standard TAT if received by 3 pm - business days)
Contact:	Rita Schofield	Quality Control (QC) Report with Report ☐ Yes ☐ No	P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
Address:	130 Stone Road West Guelph, ON N1G 3Z2	☐ Criteria on Report - provide details below if box checked Select Distribution: ☐ MAIL ☐ MAIL ☐ FAX	E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
Phone:	(519) 822-2265	Email 1 or Fax RSchofield@Siremlab.com	Specify Date Required for E2,E or P:
		Email 2 SSande@Siremlab.com	

Invoice To	Same as Report To ☑ Yes ☐ No	Invoice Distribution	
	Copy of Invoice with Report ☑ Yes ☐ No	Select Invoice Distribution: ☑ MAIL ☐ MAIL ☐ FAX	
Company:	SiREM Laboratory	Email 1 or Fax karoersma@siremlab.com	
Contact	Karen Broersma	Email 2 AccountsPayableCan@Siremlab.com	

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #		Approver ID:	Cost Center:
Job #:	SI-3965	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): L2251122 MAR-29B

ALS Contact: Gayle Braun Sampler: Alicia Quintanilla

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BTEX,F1	F2-F4	Number of Containers
1	SI-3965 Influent 29Mar2019	29-Mar-19	12:00	Water	R	R	4

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report (client Use)
Are samples taken from a Regulated DW System? ☐ Yes ☑ No	To ALS Waterloo
Are samples for human drinking water use? ☐ Yes ☑ No	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice packs Yes ☑ No ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
		7.7			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Rita Schofield Rita Schofield	3/29/2019	12:00	Received by:	Date:	Time:	Received by:	Date: Mar 29 19	Time: 14:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy

1 If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

SIREM
ATTN: Rita Schofield
130 Stone Road West
Guelph ON N1G 3Z2

Date Received: 15-APR-19
Report Date: 23-APR-19 11:04 (MT)
Version: FINAL

Client Phone: 519-822-2265

Certificate of Analysis

Lab Work Order #: L2258118

Project P.O. #: NOT SUBMITTED
Job Reference: SI-3965
C of C Numbers:
Legal Site Desc:

Gayle Braun
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2258118-1 SI-3965 COLUMN 1 EFFLUENT 12APRIL2019 Sampled By: R. SCHOFIELD on 12-APR-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	0.50		0.50	ug/L		16-APR-19	R4602294
Ethylbenzene	<0.50		0.50	ug/L		16-APR-19	R4602294
Toluene	<0.50		0.50	ug/L		16-APR-19	R4602294
o-Xylene	<0.30		0.30	ug/L		16-APR-19	R4602294
m+p-Xylenes	<0.40		0.40	ug/L		16-APR-19	R4602294
Xylenes (Total)	<0.50		0.50	ug/L		16-APR-19	
Surrogate: 4-Bromofluorobenzene	102.5		70-130	%		16-APR-19	R4602294
Surrogate: 1,4-Difluorobenzene	100.0		70-130	%		16-APR-19	R4602294
Hydrocarbons							
F1 (C6-C10)	92		25	ug/L		16-APR-19	R4602294
F1-BTEX	91		25	ug/L		17-APR-19	
F2 (C10-C16)	<100		100	ug/L	16-APR-19	16-APR-19	R4603157
F3 (C16-C34)	<250		250	ug/L	16-APR-19	16-APR-19	R4603157
F4 (C34-C50)	<250		250	ug/L	16-APR-19	16-APR-19	R4603157
Total Hydrocarbons (C6-C50)	<370		370	ug/L		17-APR-19	
Chrom. to baseline at nC50	YES				16-APR-19	16-APR-19	R4603157
Surrogate: 2-Bromobenzotrifluoride	85.6		60-140	%	16-APR-19	16-APR-19	R4603157
Surrogate: 3,4-Dichlorotoluene	81.3		60-140	%		16-APR-19	R4602294
L2258118-2 SI-3965 COLUMN 2 EFFLUENT 12APRIL2019 Sampled By: R. SCHOFIELD on 12-APR-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		16-APR-19	R4602294
Ethylbenzene	<0.50		0.50	ug/L		16-APR-19	R4602294
Toluene	<0.50		0.50	ug/L		16-APR-19	R4602294
o-Xylene	<0.30		0.30	ug/L		16-APR-19	R4602294
m+p-Xylenes	<0.40		0.40	ug/L		16-APR-19	R4602294
Xylenes (Total)	<0.50		0.50	ug/L		16-APR-19	
Surrogate: 4-Bromofluorobenzene	101.0		70-130	%		16-APR-19	R4602294
Surrogate: 1,4-Difluorobenzene	100.0		70-130	%		16-APR-19	R4602294
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		16-APR-19	R4602294
F1-BTEX	<25		25	ug/L		17-APR-19	
F2 (C10-C16)	<100		100	ug/L	16-APR-19	16-APR-19	R4603157
F3 (C16-C34)	<250		250	ug/L	16-APR-19	16-APR-19	R4603157
F4 (C34-C50)	<250		250	ug/L	16-APR-19	16-APR-19	R4603157
Total Hydrocarbons (C6-C50)	<370		370	ug/L		17-APR-19	
Chrom. to baseline at nC50	YES				16-APR-19	16-APR-19	R4603157
Surrogate: 2-Bromobenzotrifluoride	79.2		60-140	%	16-APR-19	16-APR-19	R4603157
Surrogate: 3,4-Dichlorotoluene	96.2		60-140	%		16-APR-19	R4602294
L2258118-3 SI-3965 COLUMN 3 EFFLUENT 12APRIL2019 Sampled By: R. SCHOFIELD on 12-APR-19 @ 12:00							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2258118-3 SI-3965 COLUMN 3 EFFLUENT 12APRIL2019 Sampled By: R. SCHOFIELD on 12-APR-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	18.3		0.50	ug/L		16-APR-19	R4602294
Ethylbenzene	<0.50		0.50	ug/L		16-APR-19	R4602294
Toluene	0.50		0.50	ug/L		16-APR-19	R4602294
o-Xylene	<0.30		0.30	ug/L		16-APR-19	R4602294
m+p-Xylenes	<0.40		0.40	ug/L		16-APR-19	R4602294
Xylenes (Total)	<0.50		0.50	ug/L		16-APR-19	
Surrogate: 4-Bromofluorobenzene	99.1		70-130	%		16-APR-19	R4602294
Surrogate: 1,4-Difluorobenzene	100.1		70-130	%		16-APR-19	R4602294
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		16-APR-19	R4602294
F1-BTEX	<25		25	ug/L		17-APR-19	
F2 (C10-C16)	<100		100	ug/L	16-APR-19	16-APR-19	R4603157
F3 (C16-C34)	<250		250	ug/L	16-APR-19	16-APR-19	R4603157
F4 (C34-C50)	<250		250	ug/L	16-APR-19	16-APR-19	R4603157
Total Hydrocarbons (C6-C50)	<370		370	ug/L		17-APR-19	
Chrom. to baseline at nC50	YES				16-APR-19	16-APR-19	R4603157
Surrogate: 2-Bromobenzotrifluoride	85.3		60-140	%	16-APR-19	16-APR-19	R4603157
Surrogate: 3,4-Dichlorotoluene	94.6		60-140	%		16-APR-19	R4602294
L2258118-4 SI-3965 INFLUENT 12APRIL2019 Sampled By: R. SCHOFIELD on 12-APR-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		16-APR-19	R4602294
Ethylbenzene	<0.50		0.50	ug/L		16-APR-19	R4602294
Toluene	<0.50		0.50	ug/L		16-APR-19	R4602294
o-Xylene	<0.30		0.30	ug/L		16-APR-19	R4602294
m+p-Xylenes	<0.40		0.40	ug/L		16-APR-19	R4602294
Xylenes (Total)	<0.50		0.50	ug/L		16-APR-19	
Surrogate: 4-Bromofluorobenzene	99.7		70-130	%		16-APR-19	R4602294
Surrogate: 1,4-Difluorobenzene	100.8		70-130	%		16-APR-19	R4602294
Hydrocarbons							
F1 (C6-C10)	203		25	ug/L		16-APR-19	R4602294
F1-BTEX	203		25	ug/L		17-APR-19	
F2 (C10-C16)	<100		100	ug/L	16-APR-19	16-APR-19	R4603157
F3 (C16-C34)	<250		250	ug/L	16-APR-19	16-APR-19	R4603157
F4 (C34-C50)	<250		250	ug/L	16-APR-19	16-APR-19	R4603157
Total Hydrocarbons (C6-C50)	<370		370	ug/L		17-APR-19	
Chrom. to baseline at nC50	YES				16-APR-19	16-APR-19	R4603157
Surrogate: 2-Bromobenzotrifluoride	85.1		60-140	%	16-APR-19	16-APR-19	R4603157
Surrogate: 3,4-Dichlorotoluene	74.3		60-140	%		16-APR-19	R4602294

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTX-511-HS-WT	Water	BTEX by Headspace	SW846 8260 (511)

BTX is determined by analyzing by headspace-GC/MS.

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2258118 Report Date: 23-APR-19

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Water**							
Batch R4602294								
WG3024560-4 DUP		**WG3024560-3**						
Benzene		1.32	1.29		ug/L	2.3	30	16-APR-19
Ethylbenzene		0.71	0.67		ug/L	5.8	30	16-APR-19
m+p-Xylenes		0.56	0.46		ug/L	20	30	16-APR-19
o-Xylene		0.33	0.30		ug/L	9.5	30	16-APR-19
Toluene		0.74	0.68		ug/L	8.5	30	16-APR-19
WG3024560-1 LCS								
Benzene			108.6		%		70-130	16-APR-19
Ethylbenzene			103.6		%		70-130	16-APR-19
m+p-Xylenes			103.5		%		70-130	16-APR-19
o-Xylene			102.3		%		70-130	16-APR-19
Toluene			107.7		%		70-130	16-APR-19
WG3024560-2 MB								
Benzene			<0.50		ug/L		0.5	16-APR-19
Ethylbenzene			<0.50		ug/L		0.5	16-APR-19
m+p-Xylenes			<0.40		ug/L		0.4	16-APR-19
o-Xylene			<0.30		ug/L		0.3	16-APR-19
Toluene			<0.50		ug/L		0.5	16-APR-19
Surrogate: 1,4-Difluorobenzene			100.4		%		70-130	16-APR-19
Surrogate: 4-Bromofluorobenzene			99.6		%		70-130	16-APR-19
WG3024560-5 MS		**WG3024560-3**						
Benzene			107.8		%		50-140	16-APR-19
Ethylbenzene			102.5		%		50-140	16-APR-19
m+p-Xylenes			102.3		%		50-140	16-APR-19
o-Xylene			101.8		%		50-140	16-APR-19
Toluene			105.8		%		50-140	16-APR-19
F1-HS-511-WT	**Water**							
Batch R4602294								
WG3024560-4 DUP		**WG3024560-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	16-APR-19
WG3024560-1 LCS								
F1 (C6-C10)			99.7		%		80-120	16-APR-19
WG3024560-2 MB								
F1 (C6-C10)			<25		ug/L		25	16-APR-19
Surrogate: 3,4-Dichlorotoluene			85.8		%		60-140	16-APR-19
WG3024560-5 MS		**WG3024560-3**						

Quality Control Report

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Water**							
Batch R4602294								
WG3024560-5 MS		**WG3024560-3**						
F1 (C6-C10)			89.7		%		60-140	16-APR-19
F2-F4-511-WT	**Water**							
Batch R4603157								
WG3028305-2 LCS								
F2 (C10-C16)			95.1		%		70-130	16-APR-19
F3 (C16-C34)			97.2		%		70-130	16-APR-19
F4 (C34-C50)			100.5		%		70-130	16-APR-19
WG3028305-1 MB								
F2 (C10-C16)			<100		ug/L		100	16-APR-19
F3 (C16-C34)			<250		ug/L		250	16-APR-19
F4 (C34-C50)			<250		ug/L		250	16-APR-19
Surrogate: 2-Bromobenzotrifluoride			79.3		%		60-140	16-APR-19

Quality Control Report

Workorder: L2258118 Report Date: 23-APR-19

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

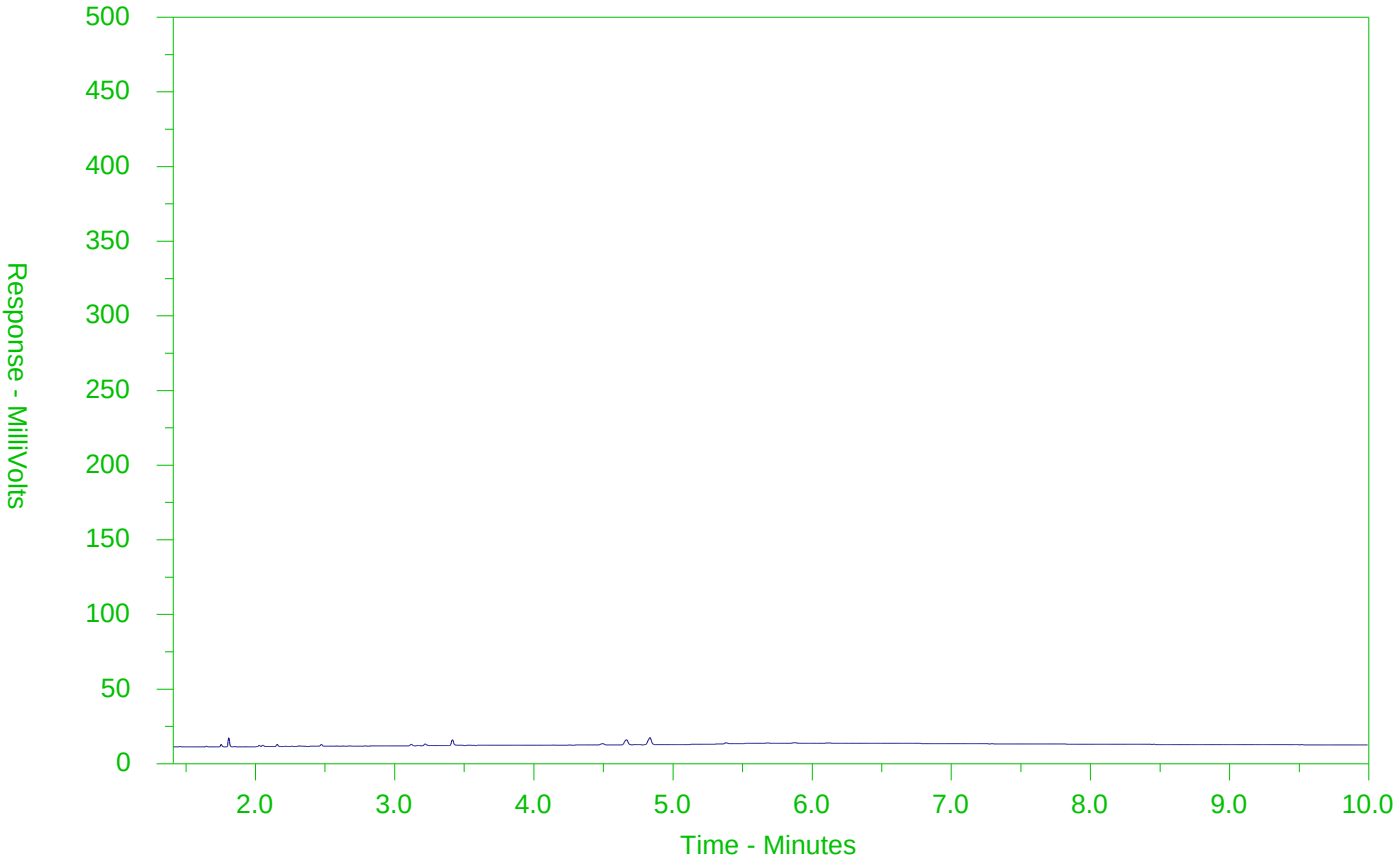
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2258118-1
Client Sample ID: SI-3965 COLUMN 1 EFFLUENT 12APRIL2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

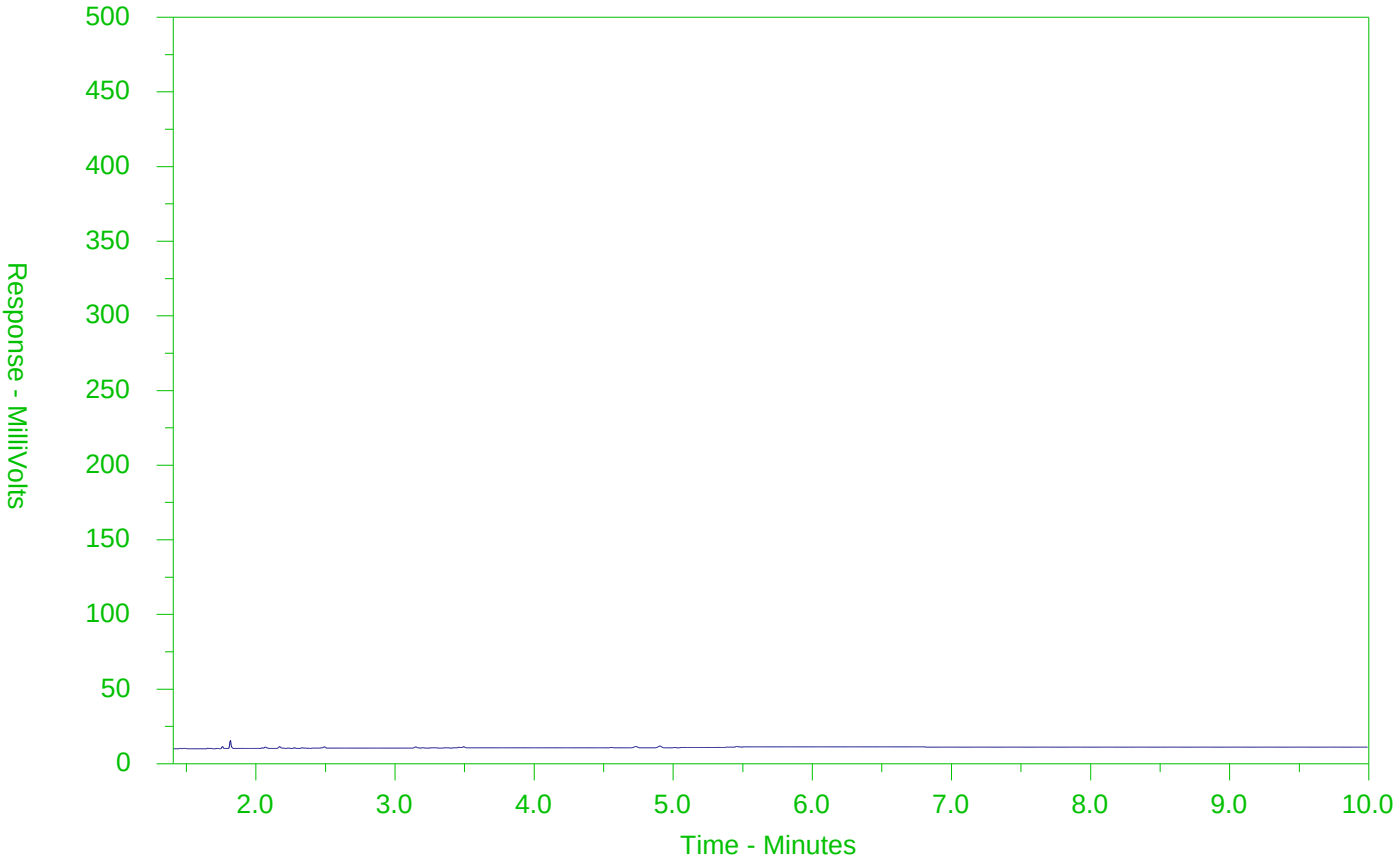
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2258118-2
Client Sample ID: SI-3965 COLUMN 2 EFFLUENT 12APRIL2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

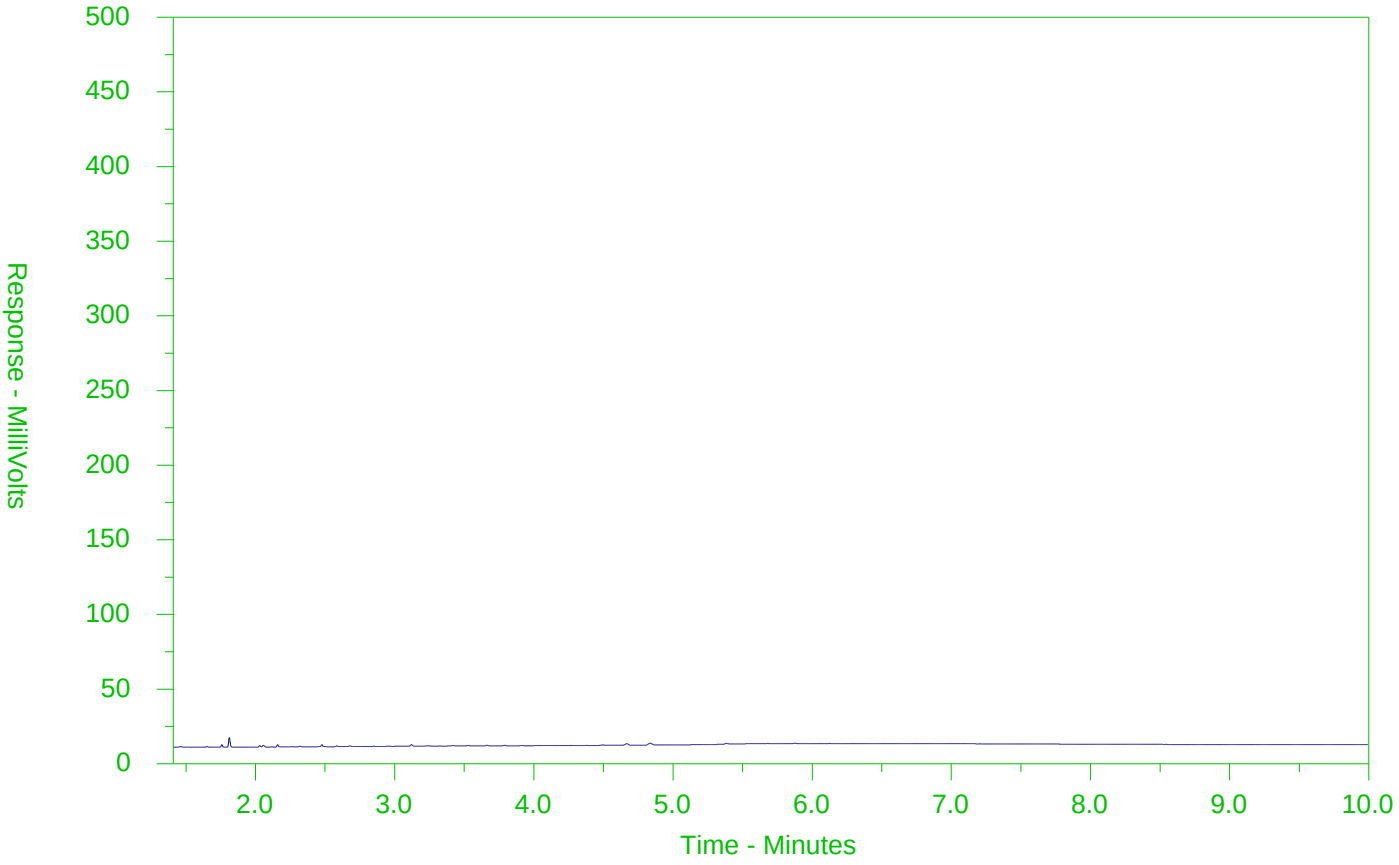
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2258118-3
Client Sample ID: SI-3965 COLUMN 3 EFFLUENT 12APRIL2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

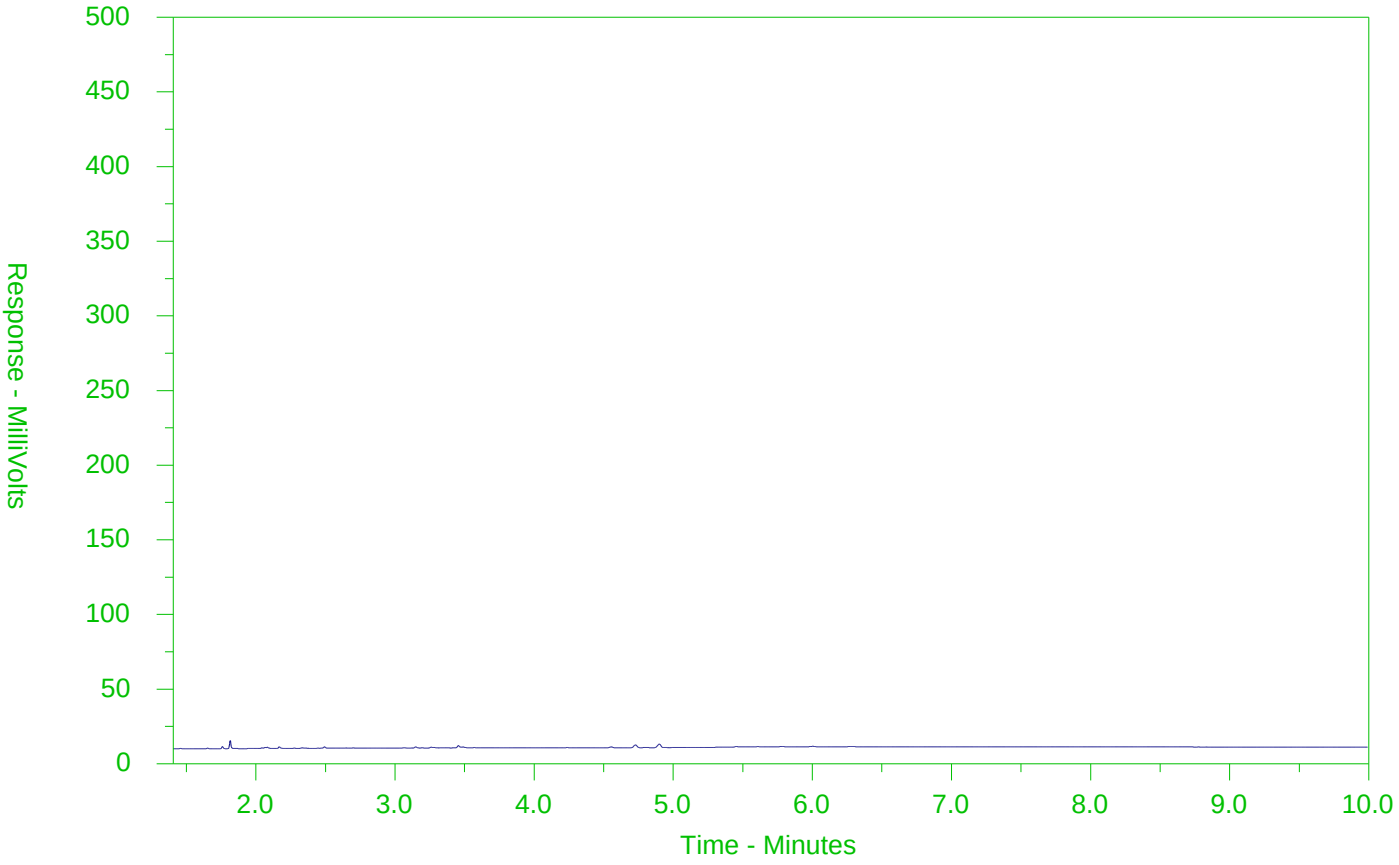
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2258118-4
Client Sample ID: SI-3965 INFLUENT 12APRIL2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

L2258118-COFC

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page 1 of 1

Report To	Rita Schofield	Report Format / Distribution	Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)
Company:	SiREM	Select Report Format: ☑PDF ☐EXCEL ☑EDD (DIGITAL)	R ☑Regular (Standard TAT if received by 3 pm - business days)
Contact:	Rita Schofield	Quality Control (QC) Report with Report: ☐Yes ☐No	P ☐Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
Address:	130 Stone Road West Guelph, ON N1G 3Z2	☐Criteria on Report - provide details below if box checked Select Distribution: ☐EMAIL ☐MAIL ☐FAX	E ☐Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT
Phone:	(519) 822-2265	Email 1 or Fax: RSchofield@Siremlab.com	E2 ☐Same day or weekend emergency - contact ALS to confirm TAT and surcharge
		Email 2: SSande@Siremlab.com	Specify Date Required for E2,E or P:

Invoice To	Same as Report To ☑Yes ☐No	Invoice Distribution	Analysis Request
	Copy of Invoice with Report ☑Yes ☐No	Select Invoice Distribution: ☑EMAIL ☐MAIL ☐FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:	SiREM Laboratory	Email 1 or Fax: kbroersma@siremlab.com	
Contact:	Karen Broersma	Email 2: AccountsPayableCan@Siremlab.com	

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q73124	Approver ID:	Cost Center:
Job #:	Si-3965	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): L2258118

ALS Contact: Gayle Braun Sampler: Rita Schofield

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BTEX,F1	F2-F4	Number of Containers
	Si-3965 Column 1 Effluent 12April2019	12-Apr-19	12:00	Water	R	R	2
	Si-3965 Column 2 Effluent 12April2019	12-Apr-19	12:00	Water	R	R	2
	Si-3965 Column 3 Effluent 12April2019	12-Apr-19	12:00	Water	R	R	2
	Si-3965 Influent 12April2019	12-Apr-19	12:00	Water	R	R	2

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report (client use)
Are samples taken from a Regulated DW System? ☐Yes ☑No	To ALS Waterloo
Are samples for human drinking water use? ☐Yes ☑No	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐ No ☐
Ice packs	Yes ☑ No ☐	Custody seal intact	Yes ☐ No ☐
Cooling Initiated	☐		

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			0.7		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Rita Schofield	April 15 2019	12:00	Received by:	Date:	Time:	Received by:	Date: 15-4-19	Time: 14:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1 If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

SIREM
ATTN: Rita Schofield
130 Stone Road West
Guelph ON N1G 3Z2

Date Received: 23-APR-19
Report Date: 30-APR-19 13:33 (MT)
Version: FINAL

Client Phone: 519-822-2265

Certificate of Analysis

Lab Work Order #: L2261603

Project P.O. #: NOT SUBMITTED
Job Reference: SI-3965
C of C Numbers:
Legal Site Desc:

Gayle Braun
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2261603-1 SI-3965 COLUMN 1 EFFLUENT 19APRIL2019 Sampled By: R. SCHOFIELD on 19-APR-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		26-APR-19	R4614343
Ethylbenzene	<0.50		0.50	ug/L		26-APR-19	R4614343
Toluene	<0.50		0.50	ug/L		26-APR-19	R4614343
o-Xylene	<0.30		0.30	ug/L		26-APR-19	R4614343
m+p-Xylenes	<0.40		0.40	ug/L		26-APR-19	R4614343
Xylenes (Total)	<0.50		0.50	ug/L		26-APR-19	
Surrogate: 4-Bromofluorobenzene	98.0		70-130	%		26-APR-19	R4614343
Surrogate: 1,4-Difluorobenzene	100.3		70-130	%		26-APR-19	R4614343
Hydrocarbons							
F1 (C6-C10)	95		25	ug/L		26-APR-19	R4614343
F1-BTEX	95		25	ug/L		26-APR-19	
F2 (C10-C16)	110		100	ug/L	23-APR-19	24-APR-19	R4611923
F3 (C16-C34)	420		250	ug/L	23-APR-19	24-APR-19	R4611923
F4 (C34-C50)	<250		250	ug/L	23-APR-19	24-APR-19	R4611923
Total Hydrocarbons (C6-C50)	630		370	ug/L		26-APR-19	
Chrom. to baseline at nC50	YES				23-APR-19	24-APR-19	R4611923
Surrogate: 2-Bromobenzotrifluoride	72.5		60-140	%	23-APR-19	24-APR-19	R4611923
Surrogate: 3,4-Dichlorotoluene	87.9		60-140	%		26-APR-19	R4614343
L2261603-2 SI-3965 COLUMN 2 EFFLUENT 19APRIL2019 Sampled By: R. SCHOFIELD on 19-APR-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		26-APR-19	R4614343
Ethylbenzene	<0.50		0.50	ug/L		26-APR-19	R4614343
Toluene	<0.50		0.50	ug/L		26-APR-19	R4614343
o-Xylene	<0.30		0.30	ug/L		26-APR-19	R4614343
m+p-Xylenes	<0.40		0.40	ug/L		26-APR-19	R4614343
Xylenes (Total)	<0.50		0.50	ug/L		26-APR-19	
Surrogate: 4-Bromofluorobenzene	98.5		70-130	%		26-APR-19	R4614343
Surrogate: 1,4-Difluorobenzene	100.7		70-130	%		26-APR-19	R4614343
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		26-APR-19	R4614343
F1-BTEX	<25		25	ug/L		26-APR-19	
F2 (C10-C16)	110		100	ug/L	23-APR-19	24-APR-19	R4611923
F3 (C16-C34)	580		250	ug/L	23-APR-19	24-APR-19	R4611923
F4 (C34-C50)	<250		250	ug/L	23-APR-19	24-APR-19	R4611923
Total Hydrocarbons (C6-C50)	690		370	ug/L		26-APR-19	
Chrom. to baseline at nC50	YES				23-APR-19	24-APR-19	R4611923
Surrogate: 2-Bromobenzotrifluoride	69.1		60-140	%	23-APR-19	24-APR-19	R4611923
Surrogate: 3,4-Dichlorotoluene	90.3		60-140	%		26-APR-19	R4614343
L2261603-3 SI-3965 COLUMN 3 EFFLUENT 19APRIL2019 Sampled By: R. SCHOFIELD on 19-APR-19 @ 12:00							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2261603-3 SI-3965 COLUMN 3 EFFLUENT 19APRIL2019 Sampled By: R. SCHOFIELD on 19-APR-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	0.71		0.50	ug/L		26-APR-19	R4614343
Ethylbenzene	<0.50		0.50	ug/L		26-APR-19	R4614343
Toluene	0.76		0.50	ug/L		26-APR-19	R4614343
o-Xylene	<0.30		0.30	ug/L		26-APR-19	R4614343
m+p-Xylenes	<0.40		0.40	ug/L		26-APR-19	R4614343
Xylenes (Total)	<0.50		0.50	ug/L		26-APR-19	
Surrogate: 4-Bromofluorobenzene	99.1		70-130	%		26-APR-19	R4614343
Surrogate: 1,4-Difluorobenzene	100.8		70-130	%		26-APR-19	R4614343
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		26-APR-19	R4614343
F1-BTEX	<25		25	ug/L		26-APR-19	
F2 (C10-C16)	130		100	ug/L	23-APR-19	24-APR-19	R4611923
F3 (C16-C34)	310		250	ug/L	23-APR-19	24-APR-19	R4611923
F4 (C34-C50)	<250		250	ug/L	23-APR-19	24-APR-19	R4611923
Total Hydrocarbons (C6-C50)	440		370	ug/L		26-APR-19	
Chrom. to baseline at nC50	YES				23-APR-19	24-APR-19	R4611923
Surrogate: 2-Bromobenzotrifluoride	80.0		60-140	%	23-APR-19	24-APR-19	R4611923
Surrogate: 3,4-Dichlorotoluene	98.0		60-140	%		26-APR-19	R4614343
L2261603-4 SI-3965 INFLUENT 19APRIL2019 Sampled By: R. SCHOFIELD on 19-APR-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		26-APR-19	R4614343
Ethylbenzene	<0.50		0.50	ug/L		26-APR-19	R4614343
Toluene	<0.50		0.50	ug/L		26-APR-19	R4614343
o-Xylene	<0.30		0.30	ug/L		26-APR-19	R4614343
m+p-Xylenes	<0.40		0.40	ug/L		26-APR-19	R4614343
Xylenes (Total)	<0.50		0.50	ug/L		26-APR-19	
Surrogate: 4-Bromofluorobenzene	98.3		70-130	%		26-APR-19	R4614343
Surrogate: 1,4-Difluorobenzene	100.7		70-130	%		26-APR-19	R4614343
Hydrocarbons							
F1 (C6-C10)	222		25	ug/L		26-APR-19	R4614343
F1-BTEX	222		25	ug/L		26-APR-19	
F2 (C10-C16)	<100		100	ug/L	23-APR-19	24-APR-19	R4611923
F3 (C16-C34)	<250		250	ug/L	23-APR-19	24-APR-19	R4611923
F4 (C34-C50)	<250		250	ug/L	23-APR-19	24-APR-19	R4611923
Total Hydrocarbons (C6-C50)	<370		370	ug/L		26-APR-19	
Chrom. to baseline at nC50	YES				23-APR-19	24-APR-19	R4611923
Surrogate: 2-Bromobenzotrifluoride	70.8		60-140	%	23-APR-19	24-APR-19	R4611923
Surrogate: 3,4-Dichlorotoluene	85.1		60-140	%		26-APR-19	R4614343

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTX-511-HS-WT	Water	BTEX by Headspace	SW846 8260 (511)

BTX is determined by analyzing by headspace-GC/MS.

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2261603 Report Date: 30-APR-19

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Water**							
Batch R4614343								
WG3034819-4 DUP		**WG3034819-3**						
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-APR-19
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-APR-19
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	26-APR-19
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	26-APR-19
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-APR-19
WG3034819-1 LCS								
Benzene			108.4		%		70-130	26-APR-19
Ethylbenzene			109.6		%		70-130	26-APR-19
m+p-Xylenes			106.4		%		70-130	26-APR-19
o-Xylene			106.4		%		70-130	26-APR-19
Toluene			109.7		%		70-130	26-APR-19
WG3034819-2 MB								
Benzene			<0.50		ug/L		0.5	26-APR-19
Ethylbenzene			<0.50		ug/L		0.5	26-APR-19
m+p-Xylenes			<0.40		ug/L		0.4	26-APR-19
o-Xylene			<0.30		ug/L		0.3	26-APR-19
Toluene			<0.50		ug/L		0.5	26-APR-19
Surrogate: 1,4-Difluorobenzene			100.9		%		70-130	26-APR-19
Surrogate: 4-Bromofluorobenzene			99.1		%		70-130	26-APR-19
WG3034819-5 MS		**WG3034819-3**						
Benzene			109.6		%		50-140	26-APR-19
Ethylbenzene			110.1		%		50-140	26-APR-19
m+p-Xylenes			105.8		%		50-140	26-APR-19
o-Xylene			107.7		%		50-140	26-APR-19
Toluene			110.8		%		50-140	26-APR-19
F1-HS-511-WT	**Water**							
Batch R4614343								
WG3034819-4 DUP		**WG3034819-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	26-APR-19
WG3034819-1 LCS								
F1 (C6-C10)			98.2		%		80-120	26-APR-19
WG3034819-2 MB								
F1 (C6-C10)			<25		ug/L		25	26-APR-19
Surrogate: 3,4-Dichlorotoluene			97.3		%		60-140	26-APR-19
WG3034819-5 MS		**WG3034819-3**						

Quality Control Report

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Water**							
Batch R4614343								
WG3034819-5 MS		**WG3034819-3**						
F1 (C6-C10)			82.4		%		60-140	26-APR-19
F2-F4-511-WT	**Water**							
Batch R4611923								
WG3033140-2 LCS								
F2 (C10-C16)			100.6		%		70-130	24-APR-19
F3 (C16-C34)			105.4		%		70-130	24-APR-19
F4 (C34-C50)			98.3		%		70-130	24-APR-19
WG3033140-1 MB								
F2 (C10-C16)			<100		ug/L		100	24-APR-19
F3 (C16-C34)			<250		ug/L		250	24-APR-19
F4 (C34-C50)			<250		ug/L		250	24-APR-19
Surrogate: 2-Bromobenzotrifluoride			77.7		%		60-140	24-APR-19

Quality Control Report

Workorder: L2261603 Report Date: 30-APR-19

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

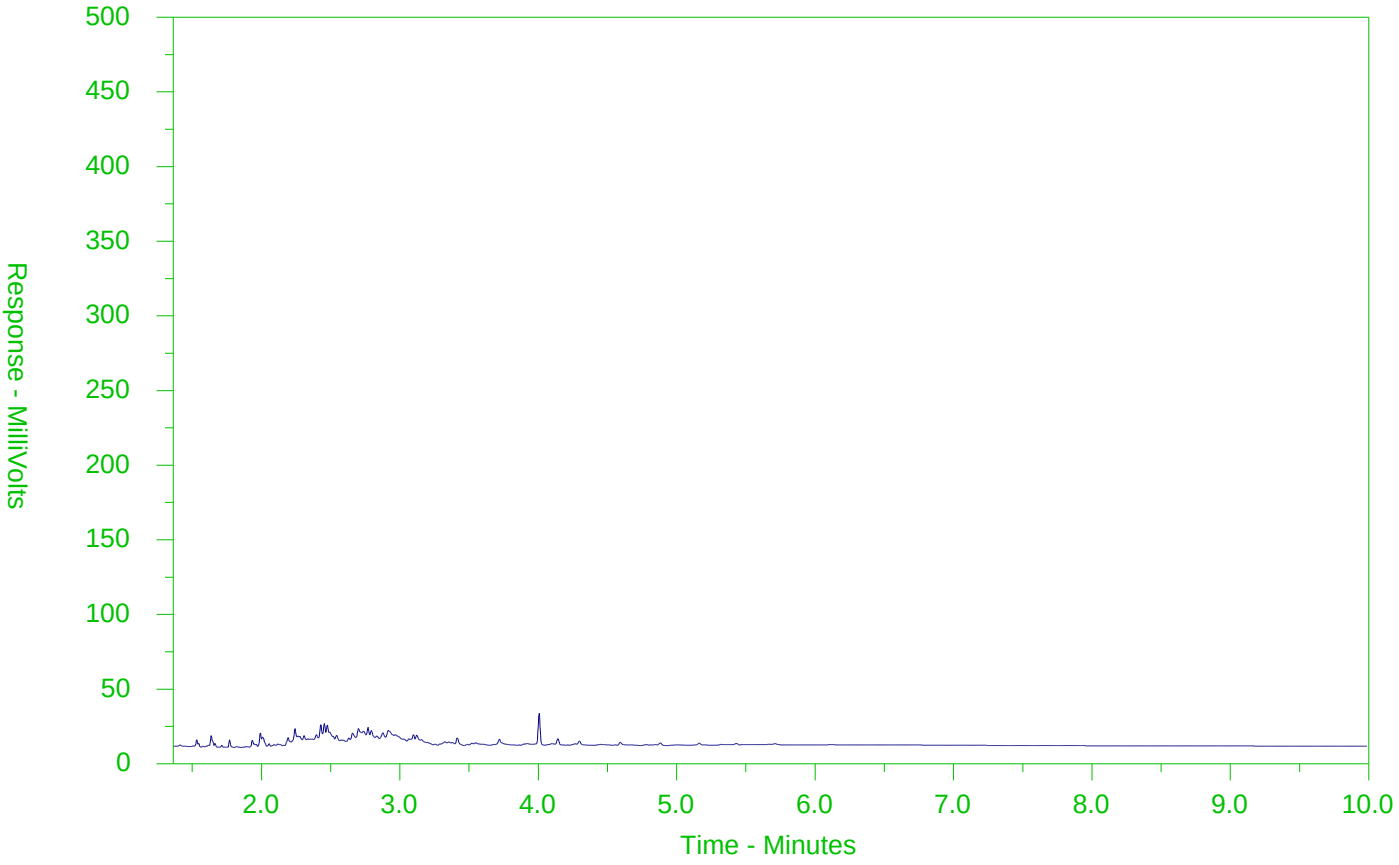
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2261603-1
Client Sample ID: SI-3965 COLUMN 1 EFFLUENT 19APRIL2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

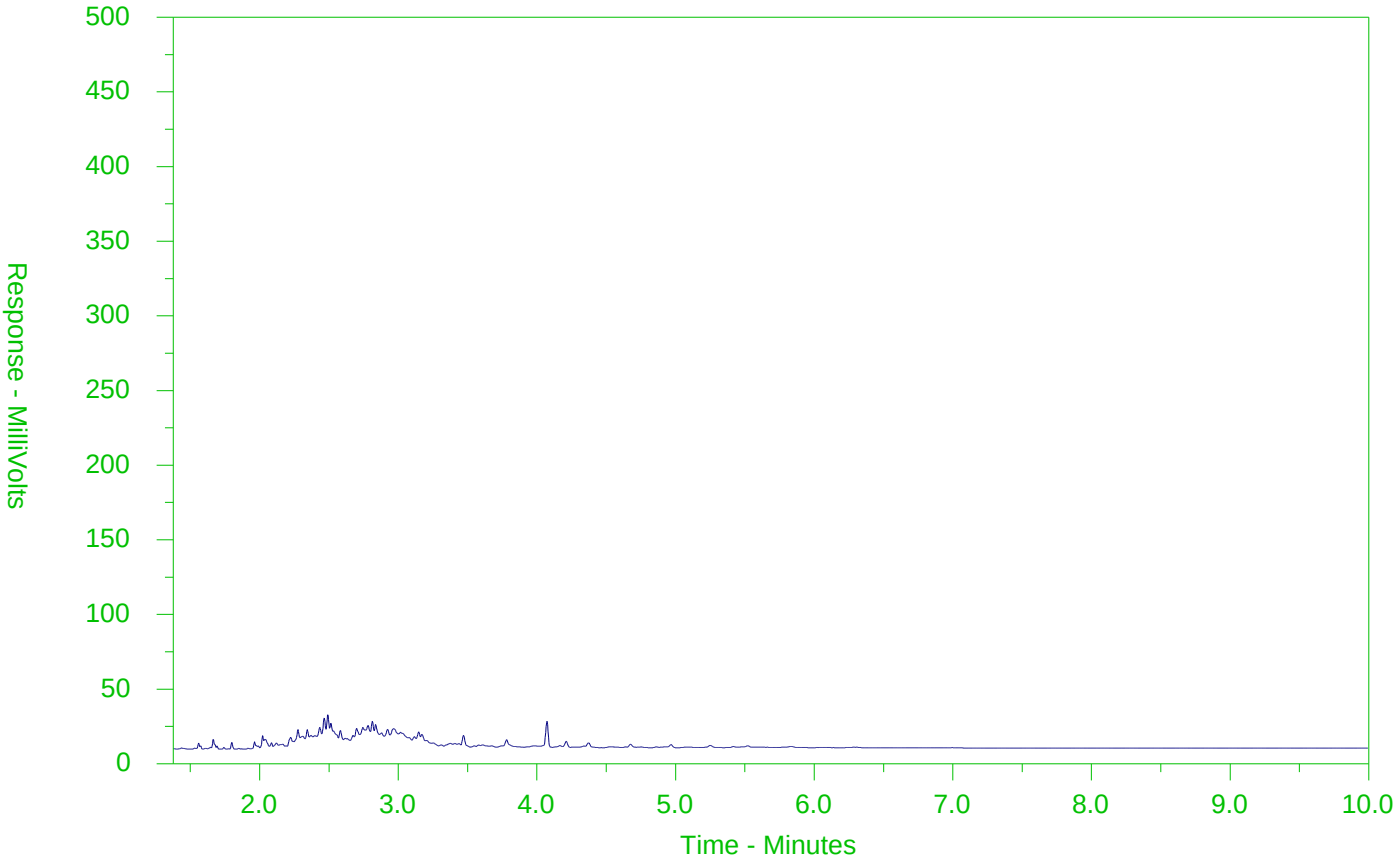
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2261603-2
Client Sample ID: SI-3965 COLUMN 2 EFFLUENT 19APRIL2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

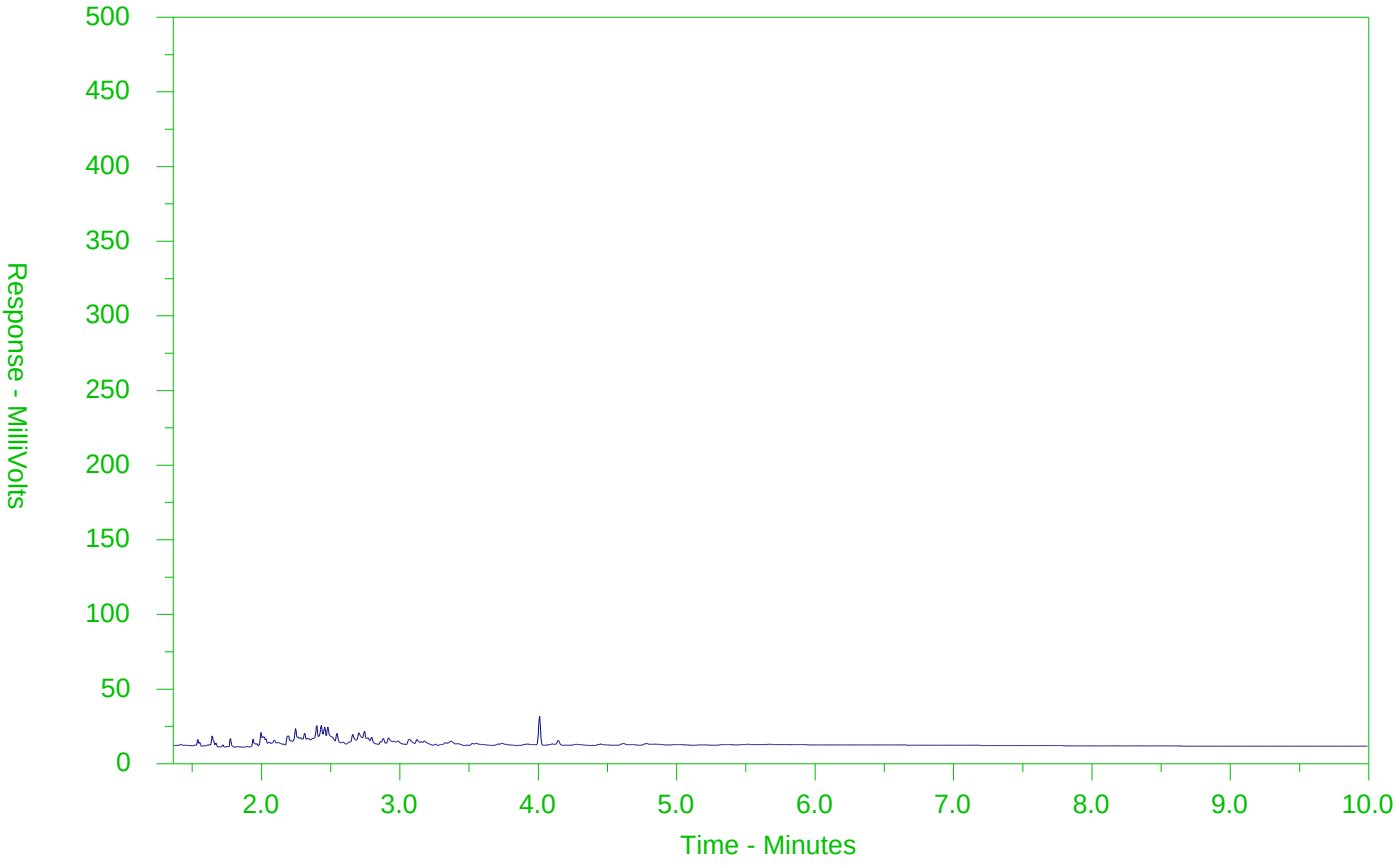
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2261603-3
Client Sample ID: SI-3965 COLUMN 3 EFFLUENT 19APRIL2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

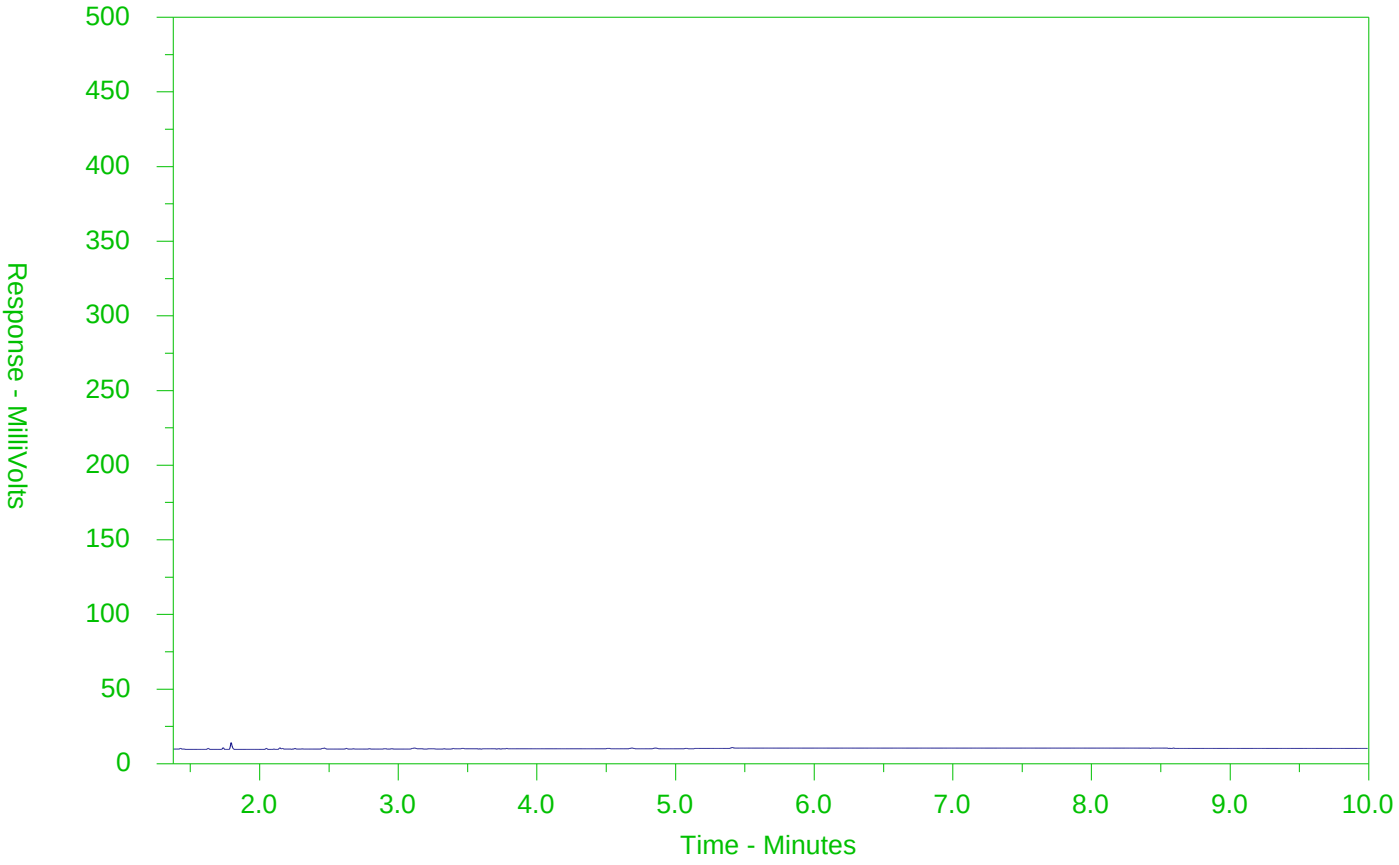
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2261603-4
Client Sample ID: SI-3965 INFLUENT 19APRIL2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2261603-COFC

Number: 19 -

Page 1 of 1

Report To	Rita Schofield	Report Format:	PDF EXCEL EDD (DIGITAL)
Company	SiREM	Quality Control (QC) Report with Report	Yes No
Contact:	Rita Schofield	Criteria on Report - provide details below if box checked	
Address:	130 Stone Road West Guelph, ON N1G 3Z2	Select Distribution:	MAIL MAIL FAX
Phone:	(519) 822-2265	Email 1 or Fax	RSchofield@Siremlab.com
		Email 2	SSande@Siremlab.com

Turnaround Time (TAT) is not available for all tests

R Regular (Standard TAT if received by 3 pm - business days)

P Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT

E Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT

E2 Same day or weekend emergency - contact ALS to confirm TAT and surcharge

Specify Date Required for E2,E or P:

Invoice To	Same as Report To Yes No	Invoice Distribution	
	Copy of Invoice with Report Yes No	Select Invoice Distribution:	MAIL MAIL FAX
Company:	SiREM Laboratory	Email 1 or Fax	kbroersma@siremlab.com
Contact:	Karen Broersma	Email 2	AccountsPayableCan@Siremlab.com

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q75124	Approver ID:	Cost Center:
Job #:	Si-3965	G/L Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): L2261603-COFC

ALS Contact: Gayla Braun Sampler: Rita Schofield

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BTEX,F1	F2-F4	Number of Containers
1	Si-3965 Column 1 Effluent 19April2019	19-Apr-19	12:00	Water	R	R	2
2	Si-3965 Column 2 Effluent 19April2019	19-Apr-19	12:00	Water	R	R	2
3	Si-3965 Column 3 Effluent 19April2019	19-Apr-19	12:00	Water	R	R	2
4	Si-3965 Influent 19April2019	19-Apr-19	12:00	Water	R	R	2

Drinking Water (DW) Samples* (client use)	Special Instructions / Specify Criteria to add on report (client Use)
Are samples taken from a Regulated DW System? Yes No	To ALS Waterloo
Are samples for human drinking water use? Yes No	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice packs ☑ Yes ☐ No ☐ Custody seal intact Yes ☐ No ☐

Cooling initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			8.3		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Rita Schofield	Date: April 23 2019	Time: 12:00	Received by:	Date:	Time:	Received by: TM	Date: 04/23/19	Time: 14:10

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analyses. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

* If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

SIREM
ATTN: Rita Schofield
130 Stone Road West
Guelph ON N1G 3Z2

Date Received: 26-APR-19
Report Date: 01-MAY-19 12:19 (MT)
Version: FINAL

Client Phone: 519-822-2265

Certificate of Analysis

Lab Work Order #: L2263945

Project P.O. #: NOT SUBMITTED
Job Reference: SI-3965
C of C Numbers:
Legal Site Desc:

Gayle Braun
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2263945-1 SI-3965 COLUMN 1 EFFLUENT 25APRIL2019 Sampled By: R.SCHOFIELD on 25-APR-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50	VOCHS	0.50	ug/L		01-MAY-19	R4618828
Ethylbenzene	<0.50	VOCHS	0.50	ug/L		01-MAY-19	R4618828
Toluene	<0.50	VOCHS	0.50	ug/L		01-MAY-19	R4618828
o-Xylene	<0.30	VOCHS	0.30	ug/L		01-MAY-19	R4618828
m+p-Xylenes	<0.40	VOCHS	0.40	ug/L		01-MAY-19	R4618828
Xylenes (Total)	<0.50		0.50	ug/L		01-MAY-19	
Surrogate: 4-Bromofluorobenzene	99.4		70-130	%		01-MAY-19	R4618828
Surrogate: 1,4-Difluorobenzene	101.4		70-130	%		01-MAY-19	R4618828
Hydrocarbons							
F1 (C6-C10)	88	VOCHS	25	ug/L		01-MAY-19	R4618828
F1-BTEX	88		25	ug/L		01-MAY-19	
F2 (C10-C16)	<100		100	ug/L	29-APR-19	30-APR-19	R4618604
F3 (C16-C34)	<250		250	ug/L	29-APR-19	30-APR-19	R4618604
F4 (C34-C50)	<250		250	ug/L	29-APR-19	30-APR-19	R4618604
Total Hydrocarbons (C6-C50)	<370		370	ug/L		01-MAY-19	
Chrom. to baseline at nC50	YES				29-APR-19	30-APR-19	R4618604
Surrogate: 2-Bromobenzotrifluoride	87.4		60-140	%	29-APR-19	30-APR-19	R4618604
Surrogate: 3,4-Dichlorotoluene	87.4		60-140	%		01-MAY-19	R4618828
L2263945-2 SI-3965 COLUMN 2 EFFLUENT 25APRIL2019 Sampled By: R.SCHOFIELD on 25-APR-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		01-MAY-19	R4618828
Ethylbenzene	<0.50		0.50	ug/L		01-MAY-19	R4618828
Toluene	<0.50		0.50	ug/L		01-MAY-19	R4618828
o-Xylene	<0.30		0.30	ug/L		01-MAY-19	R4618828
m+p-Xylenes	<0.40		0.40	ug/L		01-MAY-19	R4618828
Xylenes (Total)	<0.50		0.50	ug/L		01-MAY-19	
Surrogate: 4-Bromofluorobenzene	99.5		70-130	%		01-MAY-19	R4618828
Surrogate: 1,4-Difluorobenzene	100.3		70-130	%		01-MAY-19	R4618828
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		01-MAY-19	R4618828
F1-BTEX	<25		25	ug/L		01-MAY-19	
F2 (C10-C16)	<100		100	ug/L	29-APR-19	30-APR-19	R4618604
F3 (C16-C34)	<250		250	ug/L	29-APR-19	30-APR-19	R4618604
F4 (C34-C50)	<250		250	ug/L	29-APR-19	30-APR-19	R4618604
Total Hydrocarbons (C6-C50)	<370		370	ug/L		01-MAY-19	
Chrom. to baseline at nC50	YES				29-APR-19	30-APR-19	R4618604
Surrogate: 2-Bromobenzotrifluoride	88.8		60-140	%	29-APR-19	30-APR-19	R4618604
Surrogate: 3,4-Dichlorotoluene	88.4		60-140	%		01-MAY-19	R4618828
L2263945-3 SI-3965 COLUMN 3 EFFLUENT 25APRIL2019 Sampled By: R.SCHOFIELD on 25-APR-19 @ 12:00							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2263945-3 SI-3965 COLUMN 3 EFFLUENT 25APRIL2019 Sampled By: R.SCHOFIELD on 25-APR-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	0.73	VOCHS	0.50	ug/L		01-MAY-19	R4618828
Ethylbenzene	<0.50	VOCHS	0.50	ug/L		01-MAY-19	R4618828
Toluene	0.66	VOCHS	0.50	ug/L		01-MAY-19	R4618828
o-Xylene	<0.30	VOCHS	0.30	ug/L		01-MAY-19	R4618828
m+p-Xylenes	<0.40	VOCHS	0.40	ug/L		01-MAY-19	R4618828
Xylenes (Total)	<0.50		0.50	ug/L		01-MAY-19	
Surrogate: 4-Bromofluorobenzene	99.7		70-130	%		01-MAY-19	R4618828
Surrogate: 1,4-Difluorobenzene	100.1		70-130	%		01-MAY-19	R4618828
Hydrocarbons							
F1 (C6-C10)	<25	VOCHS	25	ug/L		01-MAY-19	R4618828
F1-BTEX	<25		25	ug/L		01-MAY-19	
F2 (C10-C16)	<100		100	ug/L	29-APR-19	30-APR-19	R4618604
F3 (C16-C34)	<250		250	ug/L	29-APR-19	30-APR-19	R4618604
F4 (C34-C50)	<250		250	ug/L	29-APR-19	30-APR-19	R4618604
Total Hydrocarbons (C6-C50)	<370		370	ug/L		01-MAY-19	
Chrom. to baseline at nC50	YES				29-APR-19	30-APR-19	R4618604
Surrogate: 2-Bromobenzotrifluoride	90.2		60-140	%	29-APR-19	30-APR-19	R4618604
Surrogate: 3,4-Dichlorotoluene	86.0		60-140	%		01-MAY-19	R4618828
L2263945-4 SI-3965 INFLUENT 25APRIL2019 Sampled By: R.SCHOFIELD on 25-APR-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		01-MAY-19	R4618828
Ethylbenzene	<0.50		0.50	ug/L		01-MAY-19	R4618828
Toluene	<0.50		0.50	ug/L		01-MAY-19	R4618828
o-Xylene	<0.30		0.30	ug/L		01-MAY-19	R4618828
m+p-Xylenes	<0.40		0.40	ug/L		01-MAY-19	R4618828
Xylenes (Total)	<0.50		0.50	ug/L		01-MAY-19	
Surrogate: 4-Bromofluorobenzene	99.4		70-130	%		01-MAY-19	R4618828
Surrogate: 1,4-Difluorobenzene	100.6		70-130	%		01-MAY-19	R4618828
Hydrocarbons							
F1 (C6-C10)	234		25	ug/L		01-MAY-19	R4618828
F1-BTEX	234		25	ug/L		01-MAY-19	
F2 (C10-C16)	<100		100	ug/L	29-APR-19	30-APR-19	R4618604
F3 (C16-C34)	<250		250	ug/L	29-APR-19	30-APR-19	R4618604
F4 (C34-C50)	<250		250	ug/L	29-APR-19	30-APR-19	R4618604
Total Hydrocarbons (C6-C50)	<370		370	ug/L		01-MAY-19	
Chrom. to baseline at nC50	YES				29-APR-19	30-APR-19	R4618604
Surrogate: 2-Bromobenzotrifluoride	88.7		60-140	%	29-APR-19	30-APR-19	R4618604
Surrogate: 3,4-Dichlorotoluene	84.5		60-140	%		01-MAY-19	R4618828

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
VOCHS	VOC analysis was conducted for a water sample that contained > 5% headspace. Results may be biased low.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTX-511-HS-WT	Water	BTEX by Headspace	SW846 8260 (511)

BTX is determined by analyzing by headspace-GC/MS.

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2263945 Report Date: 01-MAY-19

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Water**							
Batch R4618828								
WG3034326-4 DUP		**WG3034326-3**						
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-19
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-19
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	01-MAY-19
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	01-MAY-19
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-19
WG3034326-1 LCS								
Benzene			112.3		%		70-130	01-MAY-19
Ethylbenzene			109.9		%		70-130	01-MAY-19
m+p-Xylenes			105.5		%		70-130	01-MAY-19
o-Xylene			106.9		%		70-130	01-MAY-19
Toluene			111.1		%		70-130	01-MAY-19
WG3034326-2 MB								
Benzene			<0.50		ug/L		0.5	01-MAY-19
Ethylbenzene			<0.50		ug/L		0.5	01-MAY-19
m+p-Xylenes			<0.40		ug/L		0.4	01-MAY-19
o-Xylene			<0.30		ug/L		0.3	01-MAY-19
Toluene			<0.50		ug/L		0.5	01-MAY-19
Surrogate: 1,4-Difluorobenzene			100.1		%		70-130	01-MAY-19
Surrogate: 4-Bromofluorobenzene			99.4		%		70-130	01-MAY-19
WG3034326-5 MS		**WG3034326-3**						
Benzene			112.9		%		50-140	01-MAY-19
Ethylbenzene			110.2		%		50-140	01-MAY-19
m+p-Xylenes			106.3		%		50-140	01-MAY-19
o-Xylene			107.0		%		50-140	01-MAY-19
Toluene			111.4		%		50-140	01-MAY-19
F1-HS-511-WT	**Water**							
Batch R4618828								
WG3034326-4 DUP		**WG3034326-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	01-MAY-19
WG3034326-1 LCS								
F1 (C6-C10)			99.2		%		80-120	01-MAY-19
WG3034326-2 MB								
F1 (C6-C10)			<25		ug/L		25	01-MAY-19
Surrogate: 3,4-Dichlorotoluene			93.9		%		60-140	01-MAY-19
WG3034326-5 MS		**WG3034326-3**						

Quality Control Report

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Water**							
Batch R4618828								
WG3034326-5 MS		**WG3034326-3**						
F1 (C6-C10)			83.1		%		60-140	01-MAY-19
F2-F4-511-WT	**Water**							
Batch R4618604								
WG3036812-2 LCS								
F2 (C10-C16)			104.4		%		70-130	30-APR-19
F3 (C16-C34)			108.7		%		70-130	30-APR-19
F4 (C34-C50)			102.2		%		70-130	30-APR-19
WG3036812-1 MB								
F2 (C10-C16)			<100		ug/L		100	30-APR-19
F3 (C16-C34)			<250		ug/L		250	30-APR-19
F4 (C34-C50)			<250		ug/L		250	30-APR-19
Surrogate: 2-Bromobenzotrifluoride			82.1		%		60-140	30-APR-19

Quality Control Report

Workorder: L2263945 Report Date: 01-MAY-19

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

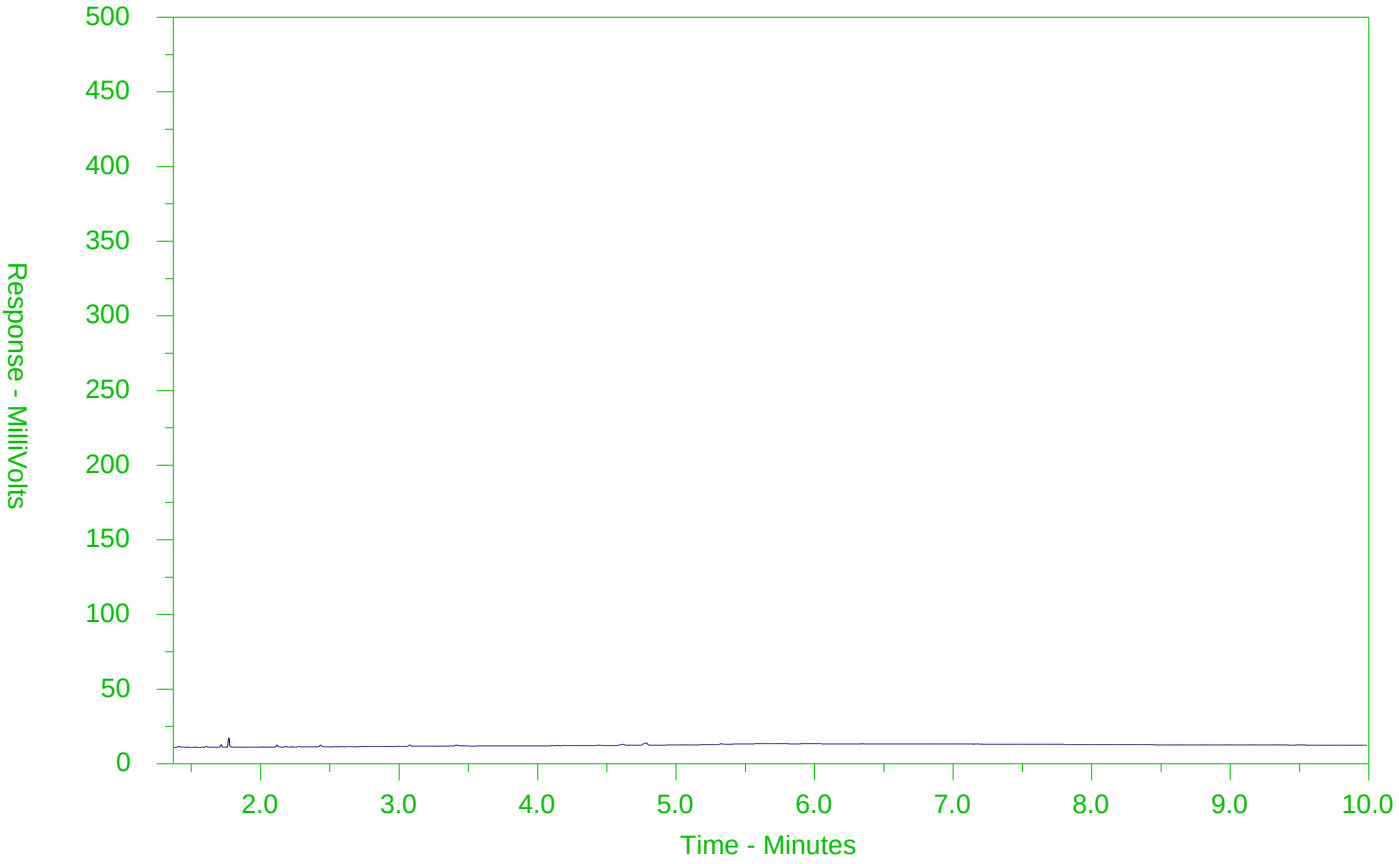
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2263945-1
Client Sample ID: SI-3965 COLUMN 1 EFFLUENT 25APRIL2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

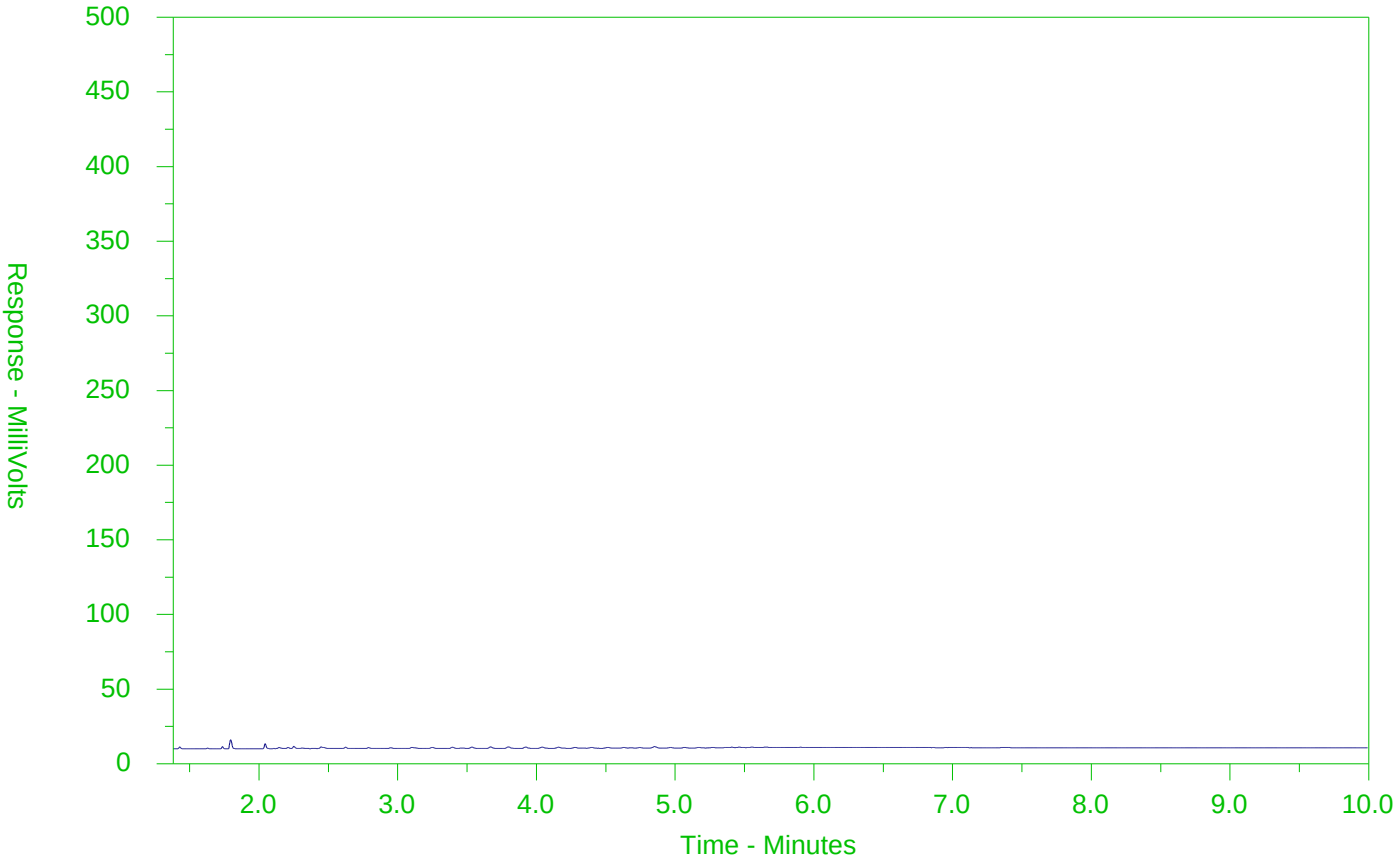
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2263945-2
Client Sample ID: SI-3965 COLUMN 2 EFFLUENT 25APRIL2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

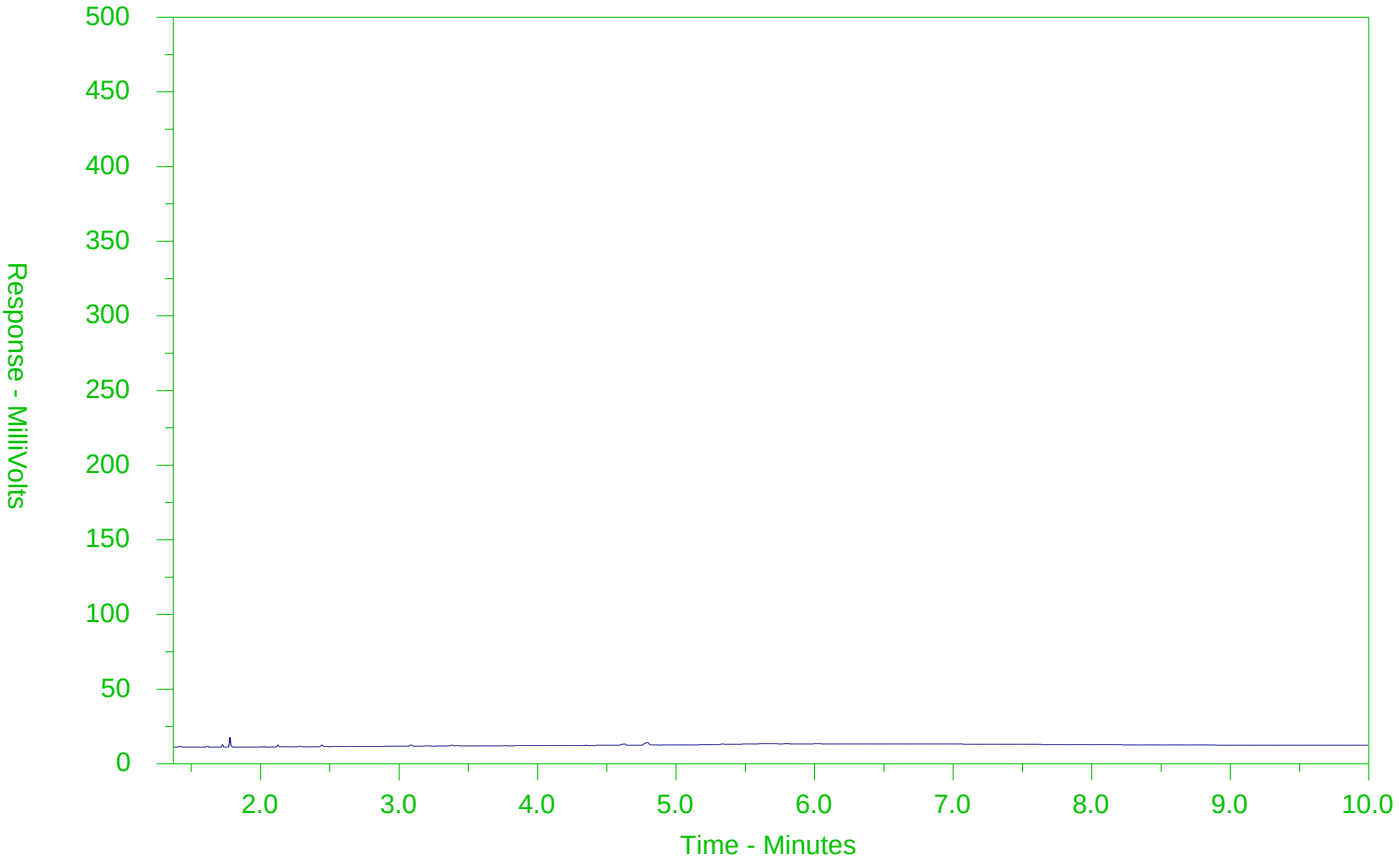
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2263945-3
Client Sample ID: SI-3965 COLUMN 3 EFFLUENT 25APRIL2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

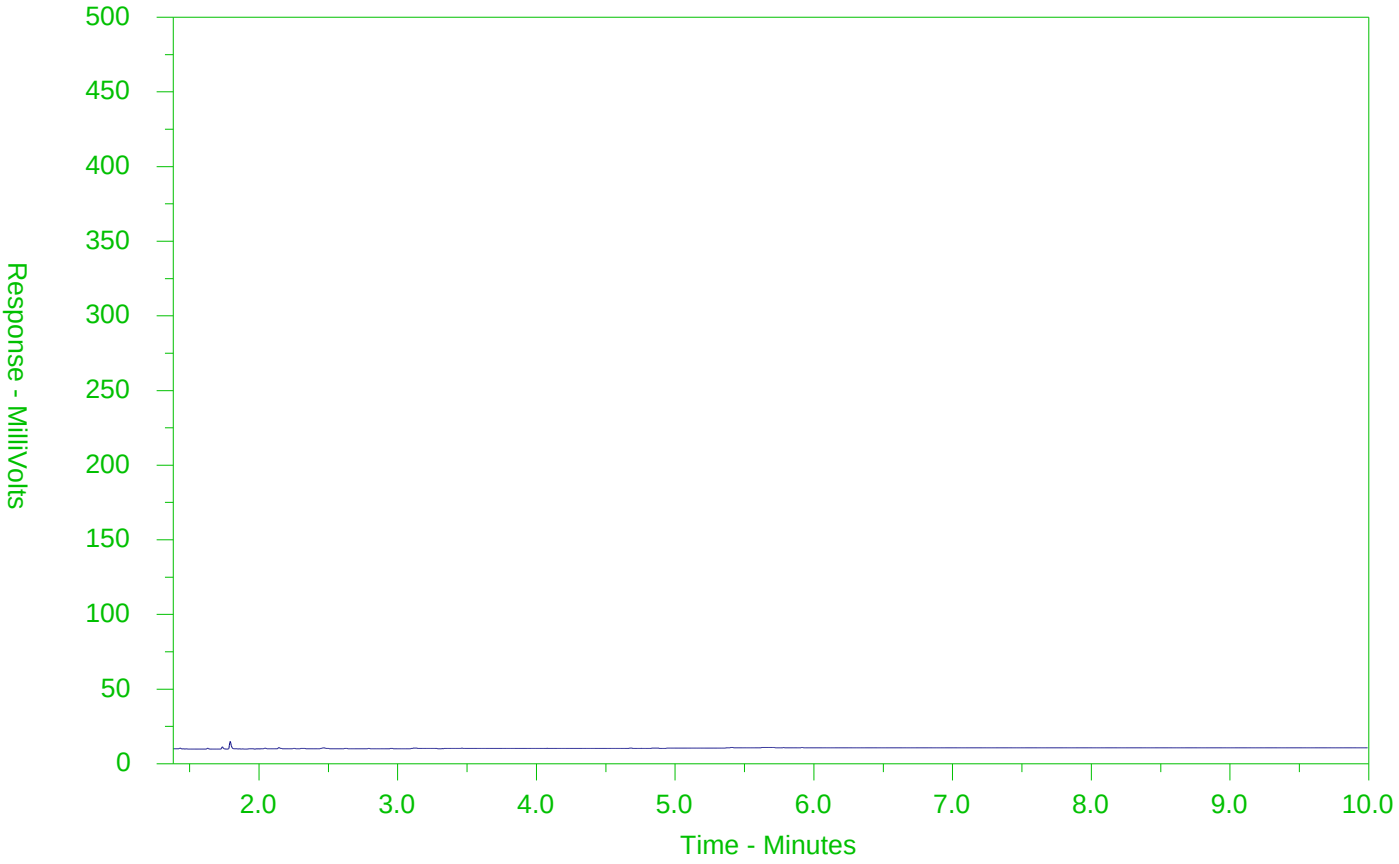
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2263945-4
Client Sample ID: SI-3965 INFLUENT 25APRIL2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analyt Request Form

L2263945-COFC

COC Number: 19 -

Page 1 of 1

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Report To	Rita Schofield	**Report Format / Distribution**	**Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)**
Company:	SiREM	Select Report Format: ☑ PDF ☐ EXCEL ☑ EDD (DIGITAL)	R ☑ Regular (Standard TAT if received by 3 pm - business days)
Contact:	Rita Schofield	Quality Control (QC) Report with Report ☐ Yes ☐ No	P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
Address:	130 Stone Road West Guelph, ON N1G 3Z2	☐ Criteria on Report - provide details below if box checked	E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT
Phone:	(519) 822-2265	Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
		Email 1 or Fax RSchofield@Siremlab.com	Specify Date Required for E2,E or P:
		Email 2 SSandu@Siremlab.com	**Analysis Request**
Invoice To	Same as Report To ☑ Yes ☐ No	**Invoice Distribution**	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
	Copy of Invoice with Report ☑ Yes ☐ No	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Company:	SiREM Laboratory	Email 1 or Fax kbroersma@siremlab.com	
Contact:	Karen Broersma	Email 2 AccountsPayableCan@Siremlab.com	
Project Information		**Oil and Gas Required Fields (client use)**	
ALS Quote #:	Q73124	Approver ID:	Cost Center:
Job #:	Si-3965	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)	L2263945	ALS Contact: Gayle Braun	Sampler: Rita Schofield

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BTEX,F1	F2-F4	Number of Containers
	Si-3965 Column 1 Effluent 25April2019	25-Apr-19	12:00	Water	R	R	2
	Si-3965 Column 2 Effluent 25April2019	25-Apr-19	12:00	Water	R	R	2
	Si-3965 Column 3 Effluent 25April2019	25-Apr-19	12:00	Water	R	R	2
	Si-3965 Influent 25April2019	25-Apr-19	12:00	Water	R	R	2

Drinking Water (DW) Samples' (client use)	Special Instructions / Specify Criteria to add on report (client Use)
Are samples taken from a Regulated DW System? ☐ Yes ☑ No	To ALS Waterloo
Are samples for human drinking water use? ☐ Yes ☑ No	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice packs Yes ☑ No ☐ Custody seal intact Yes ☐ No ☐

Cooling initiated ☐

INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C			
		5.7			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Rita Schofield	April 25 2019	12:00	Received by:	Date:	Time:	Received by:	Date: Apr 26/19	Time: 14:40

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

SIREM
ATTN: Rita Schofield
130 Stone Road West
Guelph ON N1G 3Z2

Date Received: 06-MAY-19
Report Date: 10-MAY-19 13:39 (MT)
Version: FINAL

Client Phone: 519-822-2265

Certificate of Analysis

Lab Work Order #: L2268140

Project P.O. #: NOT SUBMITTED
Job Reference: SI-3965
C of C Numbers:
Legal Site Desc:

Gayle Braun
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2268140-1 SI-3965 COLUMN 1 EFFLUENT 2MAY2019 Sampled By: R. SCHOFIELD on 02-MAY-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		09-MAY-19	R4629341
Ethylbenzene	<0.50		0.50	ug/L		09-MAY-19	R4629341
Toluene	<0.50		0.50	ug/L		09-MAY-19	R4629341
o-Xylene	<0.30		0.30	ug/L		09-MAY-19	R4629341
m+p-Xylenes	<0.40		0.40	ug/L		09-MAY-19	R4629341
Xylenes (Total)	<0.50		0.50	ug/L		09-MAY-19	
Surrogate: 4-Bromofluorobenzene	104.9		70-130	%		09-MAY-19	R4629341
Surrogate: 1,4-Difluorobenzene	100.8		70-130	%		09-MAY-19	R4629341
Hydrocarbons							
F1 (C6-C10)	167		25	ug/L		09-MAY-19	R4629341
F1-BTEX	167		25	ug/L		09-MAY-19	
F2 (C10-C16)	<100		100	ug/L	06-MAY-19	07-MAY-19	R4626848
F3 (C16-C34)	<250		250	ug/L	06-MAY-19	07-MAY-19	R4626848
F4 (C34-C50)	<250		250	ug/L	06-MAY-19	07-MAY-19	R4626848
Total Hydrocarbons (C6-C50)	<370		370	ug/L		09-MAY-19	
Chrom. to baseline at nC50	YES				06-MAY-19	07-MAY-19	R4626848
Surrogate: 2-Bromobenzotrifluoride	101.0		60-140	%	06-MAY-19	07-MAY-19	R4626848
Surrogate: 3,4-Dichlorotoluene	110.4		60-140	%		09-MAY-19	R4629341
L2268140-2 SI-3965 COLUMN 2 EFFLUENT 2MAY2019 Sampled By: R. SCHOFIELD on 02-MAY-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		09-MAY-19	R4629341
Ethylbenzene	<0.50		0.50	ug/L		09-MAY-19	R4629341
Toluene	<0.50		0.50	ug/L		09-MAY-19	R4629341
o-Xylene	<0.30		0.30	ug/L		09-MAY-19	R4629341
m+p-Xylenes	<0.40		0.40	ug/L		09-MAY-19	R4629341
Xylenes (Total)	<0.50		0.50	ug/L		09-MAY-19	
Surrogate: 4-Bromofluorobenzene	98.9		70-130	%		09-MAY-19	R4629341
Surrogate: 1,4-Difluorobenzene	100.7		70-130	%		09-MAY-19	R4629341
Hydrocarbons							
F1 (C6-C10)	26		25	ug/L		09-MAY-19	R4629341
F1-BTEX	26		25	ug/L		09-MAY-19	
F2 (C10-C16)	<100		100	ug/L	06-MAY-19	07-MAY-19	R4626848
F3 (C16-C34)	<250		250	ug/L	06-MAY-19	07-MAY-19	R4626848
F4 (C34-C50)	<250		250	ug/L	06-MAY-19	07-MAY-19	R4626848
Total Hydrocarbons (C6-C50)	<370		370	ug/L		09-MAY-19	
Chrom. to baseline at nC50	YES				06-MAY-19	07-MAY-19	R4626848
Surrogate: 2-Bromobenzotrifluoride	94.3		60-140	%	06-MAY-19	07-MAY-19	R4626848
Surrogate: 3,4-Dichlorotoluene	94.8		60-140	%		09-MAY-19	R4629341
L2268140-3 SI-3965 COLUMN 3 EFFLUENT 2MAY2019 Sampled By: R. SCHOFIELD on 02-MAY-19 @ 12:00							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2268140-3 SI-3965 COLUMN 3 EFFLUENT 2MAY2019 Sampled By: R. SCHOFIELD on 02-MAY-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	0.52		0.50	ug/L		10-MAY-19	R4630513
Ethylbenzene	<0.50		0.50	ug/L		10-MAY-19	R4630513
Toluene	<0.50		0.50	ug/L		10-MAY-19	R4630513
o-Xylene	<0.30		0.30	ug/L		10-MAY-19	R4630513
m+p-Xylenes	<0.40		0.40	ug/L		10-MAY-19	R4630513
Xylenes (Total)	<0.50		0.50	ug/L		10-MAY-19	
Surrogate: 4-Bromofluorobenzene	100.4		70-130	%		10-MAY-19	R4630513
Surrogate: 1,4-Difluorobenzene	101.5		70-130	%		10-MAY-19	R4630513
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		10-MAY-19	R4630513
F1-BTEX	<25		25	ug/L		10-MAY-19	
F2 (C10-C16)	<100		100	ug/L	06-MAY-19	07-MAY-19	R4626848
F3 (C16-C34)	<250		250	ug/L	06-MAY-19	07-MAY-19	R4626848
F4 (C34-C50)	<250		250	ug/L	06-MAY-19	07-MAY-19	R4626848
Total Hydrocarbons (C6-C50)	<370		370	ug/L		10-MAY-19	
Chrom. to baseline at nC50	YES				06-MAY-19	07-MAY-19	R4626848
Surrogate: 2-Bromobenzotrifluoride	100.3		60-140	%	06-MAY-19	07-MAY-19	R4626848
Surrogate: 3,4-Dichlorotoluene	105.0		60-140	%		10-MAY-19	R4630513
L2268140-4 SI-3965 INFLUENT 2MAY2019 Sampled By: R. SCHOFIELD on 02-MAY-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		09-MAY-19	R4629341
Ethylbenzene	<0.50		0.50	ug/L		09-MAY-19	R4629341
Toluene	<0.50		0.50	ug/L		09-MAY-19	R4629341
o-Xylene	<0.30		0.30	ug/L		09-MAY-19	R4629341
m+p-Xylenes	<0.40		0.40	ug/L		09-MAY-19	R4629341
Xylenes (Total)	<0.50		0.50	ug/L		09-MAY-19	
Surrogate: 4-Bromofluorobenzene	98.8		70-130	%		09-MAY-19	R4629341
Surrogate: 1,4-Difluorobenzene	100.8		70-130	%		09-MAY-19	R4629341
Hydrocarbons							
F1 (C6-C10)	339		25	ug/L		09-MAY-19	R4629341
F1-BTEX	339		25	ug/L		09-MAY-19	
F2 (C10-C16)	<100		100	ug/L	06-MAY-19	07-MAY-19	R4626848
F3 (C16-C34)	<250		250	ug/L	06-MAY-19	07-MAY-19	R4626848
F4 (C34-C50)	<250		250	ug/L	06-MAY-19	07-MAY-19	R4626848
Total Hydrocarbons (C6-C50)	<370		370	ug/L		09-MAY-19	
Chrom. to baseline at nC50	YES				06-MAY-19	07-MAY-19	R4626848
Surrogate: 2-Bromobenzotrifluoride	94.6		60-140	%	06-MAY-19	07-MAY-19	R4626848
Surrogate: 3,4-Dichlorotoluene	86.7		60-140	%		09-MAY-19	R4629341

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTX-511-HS-WT	Water	BTEX by Headspace	SW846 8260 (511)

BTX is determined by analyzing by headspace-GC/MS.

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2268140 Report Date: 10-MAY-19

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Water**							
Batch R4629341								
WG3043727-4 DUP		**WG3043727-3**						
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-MAY-19
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-MAY-19
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	09-MAY-19
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	09-MAY-19
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-MAY-19
WG3043727-1 LCS								
Benzene			104.2		%		70-130	09-MAY-19
Ethylbenzene			99.7		%		70-130	09-MAY-19
m+p-Xylenes			98.9		%		70-130	09-MAY-19
o-Xylene			99.4		%		70-130	09-MAY-19
Toluene			100.4		%		70-130	09-MAY-19
WG3043727-2 MB								
Benzene			<0.50		ug/L		0.5	09-MAY-19
Ethylbenzene			<0.50		ug/L		0.5	09-MAY-19
m+p-Xylenes			<0.40		ug/L		0.4	09-MAY-19
o-Xylene			<0.30		ug/L		0.3	09-MAY-19
Toluene			<0.50		ug/L		0.5	09-MAY-19
Surrogate: 1,4-Difluorobenzene			100.4		%		70-130	09-MAY-19
Surrogate: 4-Bromofluorobenzene			98.8		%		70-130	09-MAY-19
WG3043727-5 MS		**WG3043727-3**						
Benzene			105.2		%		50-140	09-MAY-19
Ethylbenzene			98.1		%		50-140	09-MAY-19
m+p-Xylenes			98.0		%		50-140	09-MAY-19
o-Xylene			98.1		%		50-140	09-MAY-19
Toluene			99.4		%		50-140	09-MAY-19
Batch R4630513								
WG3043730-1 LCS								
Benzene			103.4		%		70-130	10-MAY-19
Ethylbenzene			100.5		%		70-130	10-MAY-19
m+p-Xylenes			100.3		%		70-130	10-MAY-19
o-Xylene			99.2		%		70-130	10-MAY-19
Toluene			100.9		%		70-130	10-MAY-19
WG3043730-2 MB								
Benzene			<0.50		ug/L		0.5	10-MAY-19

Quality Control Report

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Water**							
Batch R4630513								
WG3043730-2 MB								
Ethylbenzene			<0.50		ug/L		0.5	10-MAY-19
m+p-Xylenes			<0.40		ug/L		0.4	10-MAY-19
o-Xylene			<0.30		ug/L		0.3	10-MAY-19
Toluene			<0.50		ug/L		0.5	10-MAY-19
Surrogate: 1,4-Difluorobenzene			101.2		%		70-130	10-MAY-19
Surrogate: 4-Bromofluorobenzene			99.0		%		70-130	10-MAY-19
F1-HS-511-WT	**Water**							
Batch R4629341								
WG3043727-4 DUP		**WG3043727-3**						
F1 (C6-C10)		<25	32	RPD-NA	ug/L	N/A	30	09-MAY-19
WG3043727-1 LCS								
F1 (C6-C10)			97.0		%		80-120	09-MAY-19
WG3043727-2 MB								
F1 (C6-C10)			<25		ug/L		25	09-MAY-19
Surrogate: 3,4-Dichlorotoluene			120.0		%		60-140	09-MAY-19
WG3043727-5 MS		**WG3043727-3**						
F1 (C6-C10)			87.3		%		60-140	09-MAY-19
Batch R4630513								
WG3043730-1 LCS								
F1 (C6-C10)			104.3		%		80-120	10-MAY-19
WG3043730-2 MB								
F1 (C6-C10)			<25		ug/L		25	10-MAY-19
Surrogate: 3,4-Dichlorotoluene			109.3		%		60-140	10-MAY-19
F2-F4-511-WT	**Water**							
Batch R4626848								
WG3042835-2 LCS								
F2 (C10-C16)			100.8		%		70-130	07-MAY-19
F3 (C16-C34)			101.2		%		70-130	07-MAY-19
F4 (C34-C50)			105.0		%		70-130	07-MAY-19
WG3042835-1 MB								
F2 (C10-C16)			<100		ug/L		100	07-MAY-19
F3 (C16-C34)			<250		ug/L		250	07-MAY-19
F4 (C34-C50)			<250		ug/L		250	07-MAY-19
Surrogate: 2-Bromobenzotrifluoride			94.4		%		60-140	07-MAY-19

Quality Control Report

Workorder: L2268140 Report Date: 10-MAY-19

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

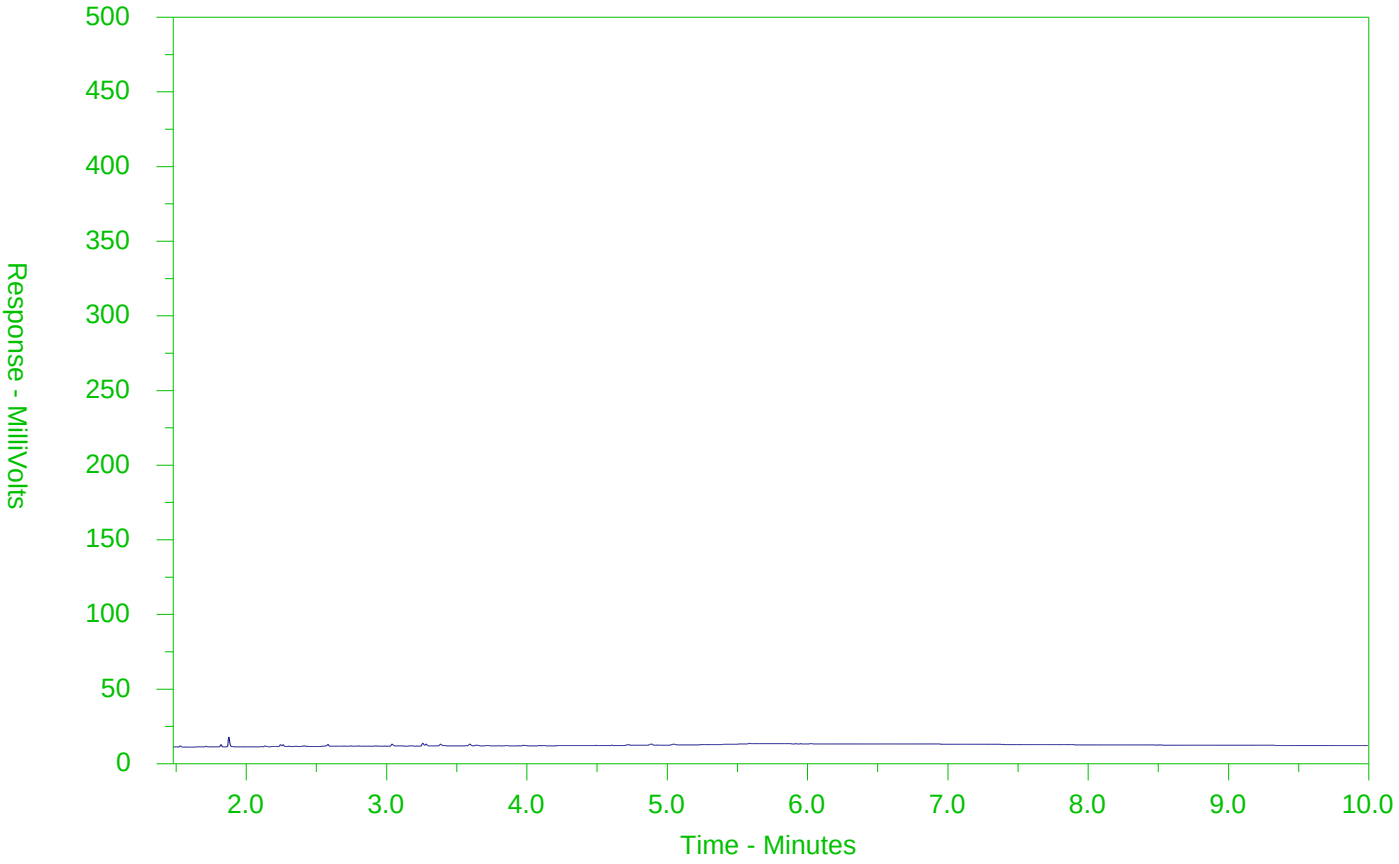
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2268140-1
Client Sample ID: SI-3965 COLUMN 1 EFFLUENT 2MAY2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

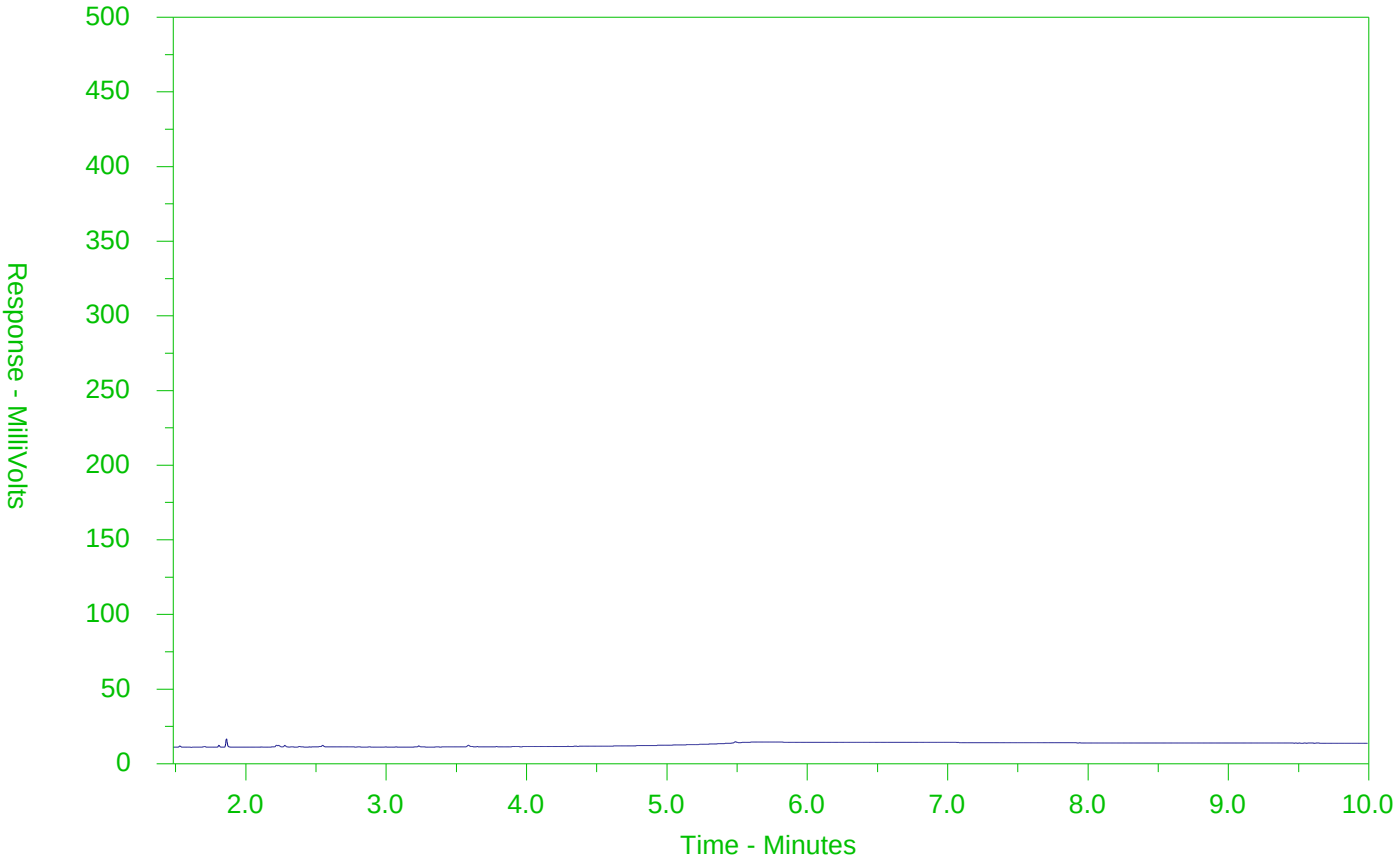
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2268140-2
Client Sample ID: SI-3965 COLUMN 2 EFFLUENT 2MAY2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

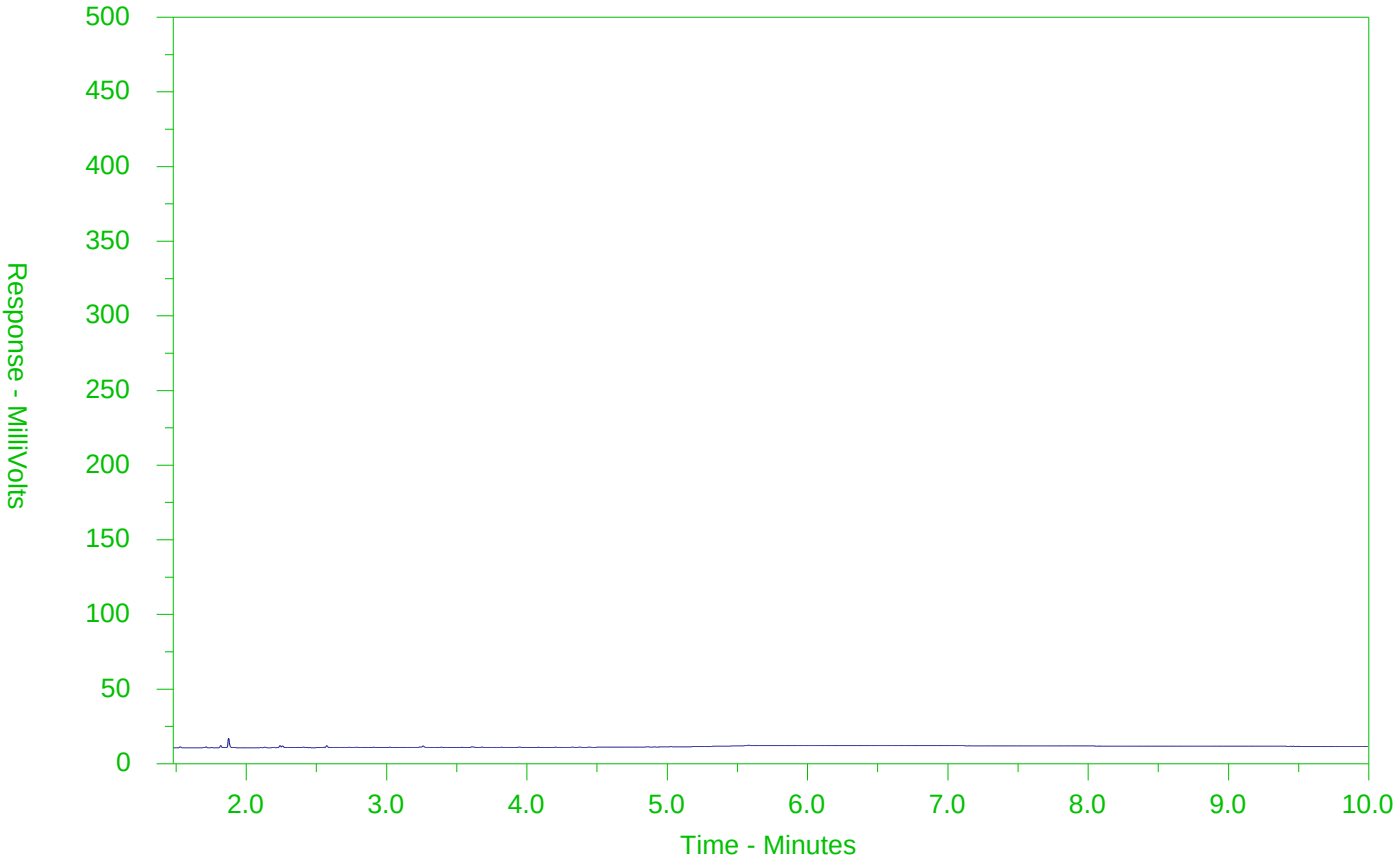
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2268140-3
Client Sample ID: SI-3965 COLUMN 3 EFFLUENT 2MAY2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

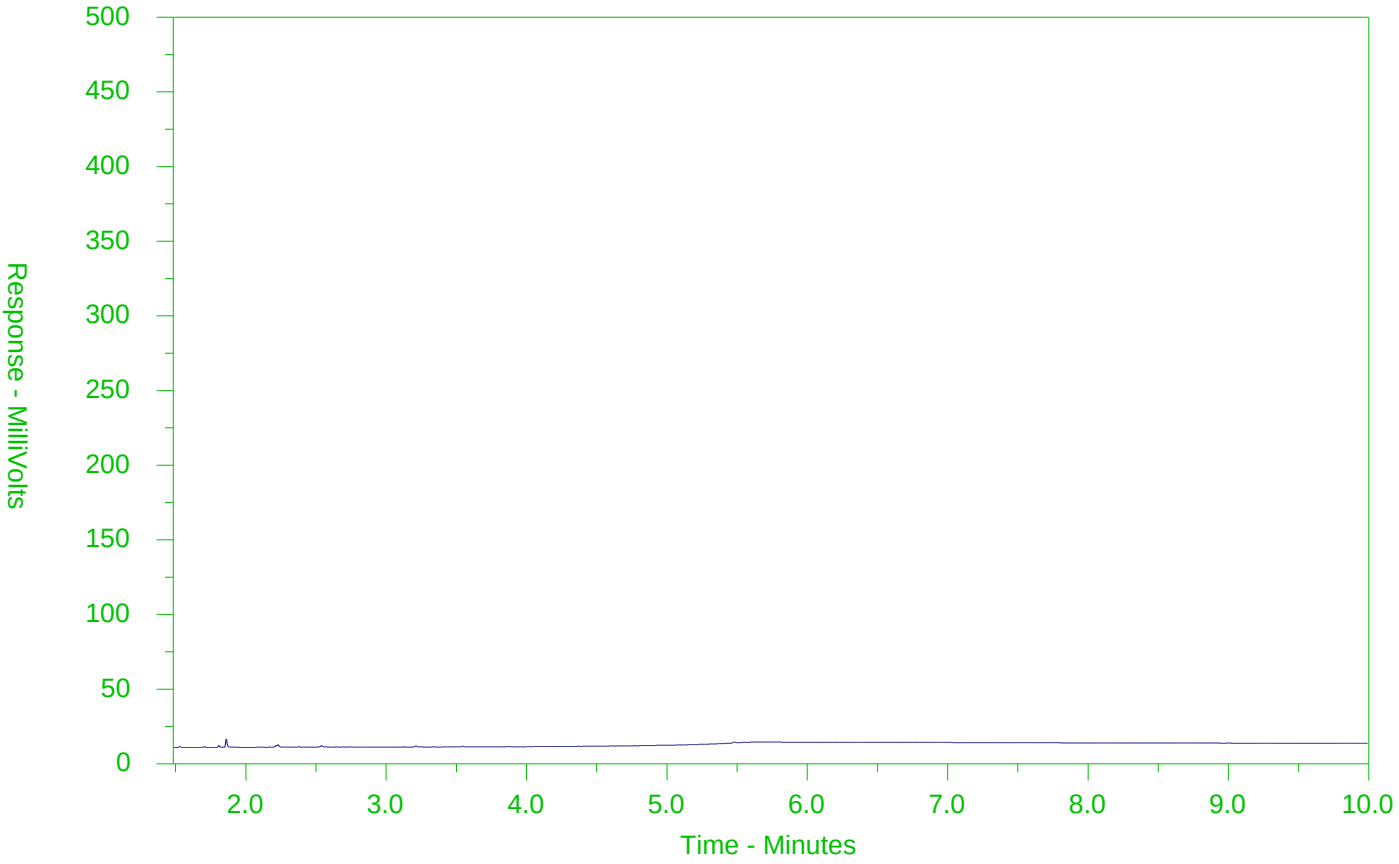
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2268140-4
Client Sample ID: SI-3965 INFLUENT 2MAY2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

L2268140-COFC

Canada Toll Free: 1 800 668 9878

Number 19 -

Page 1 of 1

Report To	Rita Schofield
Company:	SIREM
Contact:	Rita Schofield
Address:	130 Stone Road West Guelph, ON N1G 3Z2
Phone:	(519) 822-2265
Invoice To	Same as Report To ☑ Yes ☐ No
	Copy of Invoice with Report ☑ Yes ☐ No
Company:	SIREM Laboratory
Contact:	Karen Broersma

Report Format / Distribution

Select Report Format: ☑ PDF ☐ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☐ Yes ☐ No

☐ Criteria on Report - provide details below if box checked

Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax RSchofield@Siremlab.com

Email 2 SSands@Siremlab.com

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax kbroersma@siremlab.com

Email 2 AccountsPayableCan@Siremlab.com

Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)

R ☑ Regular (Standard TAT if received by 3 pm - business days)

P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT

E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT

E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge

Specify Date Required for E2,E or P:

Project Information

ALS Quote #:	Q73124
Job #:	Si-3965
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

Approver ID:		Cost Center:	
GL Account:		Routing Code:	
Activity Code:			
Location:			

ALS Lab Work Order # (lab use only): L2268140

ALS Contact: Gayle Braun | Sampler: Rita Schofield

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BTEX,F1	F2-F4	Number of Containers
	Si-3965 Column 1 Effluent 2May2019	2-May-19	12:00	Water	R	R	2
	Si-3965 Column 2 Effluent 2May2019	2-May-19	12:00	Water	R	R	2
	Si-3965 Column 3 Effluent 2May2019	2-May-19	12:00	Water	R	R	2
	Si-3965 Influent 2May2019	2-May-19	12:00	Water	R	R	2

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ Yes ☑ No

Are samples for human drinking water use? ☐ Yes ☑ No

Special Instructions / Specify Criteria to add on report (client Use)

To ALS Waterloo

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice packs Yes ☑ No ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C | FINAL COOLER TEMPERATURES °C: 5.0

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Rita Schofield (Rita Schofield)	Date: 5/2/2019	Time: 12:00	Received by:	Date:	Time:	Received by: [signature]	Date: may 6/19	Time: 2:41

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

SIREM
ATTN: Rita Schofield
130 Stone Road West
Guelph ON N1G 3Z2

Date Received: 06-MAY-19
Report Date: 23-MAY-19 08:10 (MT)
Version: FINAL REV. 2

Client Phone: 519-822-2265

Certificate of Analysis

Lab Work Order #: L2268140

Project P.O. #: NOT SUBMITTED
Job Reference: SI-3965
C of C Numbers:
Legal Site Desc:

Comments:
23-MAY-2019 VOCHS qualifier added to -3

Gayle Braun
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2268140-1 SI-3965 COLUMN 1 EFFLUENT 2MAY2019 Sampled By: R. SCHOFIELD on 02-MAY-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		09-MAY-19	R4629341
Ethylbenzene	<0.50		0.50	ug/L		09-MAY-19	R4629341
Toluene	<0.50		0.50	ug/L		09-MAY-19	R4629341
o-Xylene	<0.30		0.30	ug/L		09-MAY-19	R4629341
m+p-Xylenes	<0.40		0.40	ug/L		09-MAY-19	R4629341
Xylenes (Total)	<0.50		0.50	ug/L		09-MAY-19	
Surrogate: 4-Bromofluorobenzene	104.9		70-130	%		09-MAY-19	R4629341
Surrogate: 1,4-Difluorobenzene	100.8		70-130	%		09-MAY-19	R4629341
Hydrocarbons							
F1 (C6-C10)	167		25	ug/L		09-MAY-19	R4629341
F1-BTEX	167		25	ug/L		09-MAY-19	
F2 (C10-C16)	<100		100	ug/L	06-MAY-19	07-MAY-19	R4626848
F3 (C16-C34)	<250		250	ug/L	06-MAY-19	07-MAY-19	R4626848
F4 (C34-C50)	<250		250	ug/L	06-MAY-19	07-MAY-19	R4626848
Total Hydrocarbons (C6-C50)	<370		370	ug/L		09-MAY-19	
Chrom. to baseline at nC50	YES				06-MAY-19	07-MAY-19	R4626848
Surrogate: 2-Bromobenzotrifluoride	101.0		60-140	%	06-MAY-19	07-MAY-19	R4626848
Surrogate: 3,4-Dichlorotoluene	110.4		60-140	%		09-MAY-19	R4629341
L2268140-2 SI-3965 COLUMN 2 EFFLUENT 2MAY2019 Sampled By: R. SCHOFIELD on 02-MAY-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		09-MAY-19	R4629341
Ethylbenzene	<0.50		0.50	ug/L		09-MAY-19	R4629341
Toluene	<0.50		0.50	ug/L		09-MAY-19	R4629341
o-Xylene	<0.30		0.30	ug/L		09-MAY-19	R4629341
m+p-Xylenes	<0.40		0.40	ug/L		09-MAY-19	R4629341
Xylenes (Total)	<0.50		0.50	ug/L		09-MAY-19	
Surrogate: 4-Bromofluorobenzene	98.9		70-130	%		09-MAY-19	R4629341
Surrogate: 1,4-Difluorobenzene	100.7		70-130	%		09-MAY-19	R4629341
Hydrocarbons							
F1 (C6-C10)	26		25	ug/L		09-MAY-19	R4629341
F1-BTEX	26		25	ug/L		09-MAY-19	
F2 (C10-C16)	<100		100	ug/L	06-MAY-19	07-MAY-19	R4626848
F3 (C16-C34)	<250		250	ug/L	06-MAY-19	07-MAY-19	R4626848
F4 (C34-C50)	<250		250	ug/L	06-MAY-19	07-MAY-19	R4626848
Total Hydrocarbons (C6-C50)	<370		370	ug/L		09-MAY-19	
Chrom. to baseline at nC50	YES				06-MAY-19	07-MAY-19	R4626848
Surrogate: 2-Bromobenzotrifluoride	94.3		60-140	%	06-MAY-19	07-MAY-19	R4626848
Surrogate: 3,4-Dichlorotoluene	94.8		60-140	%		09-MAY-19	R4629341
L2268140-3 SI-3965 COLUMN 3 EFFLUENT 2MAY2019 Sampled By: R. SCHOFIELD on 02-MAY-19 @ 12:00							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2268140-3 SI-3965 COLUMN 3 EFFLUENT 2MAY2019 Sampled By: R. SCHOFIELD on 02-MAY-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	0.52	VOCHS	0.50	ug/L		10-MAY-19	R4630513
Ethylbenzene	<0.50	VOCHS	0.50	ug/L		10-MAY-19	R4630513
Toluene	<0.50	VOCHS	0.50	ug/L		10-MAY-19	R4630513
o-Xylene	<0.30	VOCHS	0.30	ug/L		10-MAY-19	R4630513
m+p-Xylenes	<0.40	VOCHS	0.40	ug/L		10-MAY-19	R4630513
Xylenes (Total)	<0.50		0.50	ug/L		10-MAY-19	
Surrogate: 4-Bromofluorobenzene	100.4		70-130	%		10-MAY-19	R4630513
Surrogate: 1,4-Difluorobenzene	101.5		70-130	%		10-MAY-19	R4630513
Hydrocarbons							
F1 (C6-C10)	<25	VOCHS	25	ug/L		10-MAY-19	R4630513
F1-BTEX	<25		25	ug/L		10-MAY-19	
F2 (C10-C16)	<100		100	ug/L	06-MAY-19	07-MAY-19	R4626848
F3 (C16-C34)	<250		250	ug/L	06-MAY-19	07-MAY-19	R4626848
F4 (C34-C50)	<250		250	ug/L	06-MAY-19	07-MAY-19	R4626848
Total Hydrocarbons (C6-C50)	<370		370	ug/L		10-MAY-19	
Chrom. to baseline at nC50	YES				06-MAY-19	07-MAY-19	R4626848
Surrogate: 2-Bromobenzotrifluoride	100.3		60-140	%	06-MAY-19	07-MAY-19	R4626848
Surrogate: 3,4-Dichlorotoluene	105.0		60-140	%		10-MAY-19	R4630513
L2268140-4 SI-3965 INFLUENT 2MAY2019 Sampled By: R. SCHOFIELD on 02-MAY-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		09-MAY-19	R4629341
Ethylbenzene	<0.50		0.50	ug/L		09-MAY-19	R4629341
Toluene	<0.50		0.50	ug/L		09-MAY-19	R4629341
o-Xylene	<0.30		0.30	ug/L		09-MAY-19	R4629341
m+p-Xylenes	<0.40		0.40	ug/L		09-MAY-19	R4629341
Xylenes (Total)	<0.50		0.50	ug/L		09-MAY-19	
Surrogate: 4-Bromofluorobenzene	98.8		70-130	%		09-MAY-19	R4629341
Surrogate: 1,4-Difluorobenzene	100.8		70-130	%		09-MAY-19	R4629341
Hydrocarbons							
F1 (C6-C10)	339		25	ug/L		09-MAY-19	R4629341
F1-BTEX	339		25	ug/L		09-MAY-19	
F2 (C10-C16)	<100		100	ug/L	06-MAY-19	07-MAY-19	R4626848
F3 (C16-C34)	<250		250	ug/L	06-MAY-19	07-MAY-19	R4626848
F4 (C34-C50)	<250		250	ug/L	06-MAY-19	07-MAY-19	R4626848
Total Hydrocarbons (C6-C50)	<370		370	ug/L		09-MAY-19	
Chrom. to baseline at nC50	YES				06-MAY-19	07-MAY-19	R4626848
Surrogate: 2-Bromobenzotrifluoride	94.6		60-140	%	06-MAY-19	07-MAY-19	R4626848
Surrogate: 3,4-Dichlorotoluene	86.7		60-140	%		09-MAY-19	R4629341

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
VOCHS	VOC analysis was conducted for a water sample that contained > 5% headspace. Results may be biased low.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTX-511-HS-WT	Water	BTEX by Headspace	SW846 8260 (511)

BTX is determined by analyzing by headspace-GC/MS.

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2268140 Report Date: 23-MAY-19

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Water**							
Batch R4629341								
WG3043727-4 DUP		**WG3043727-3**						
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-MAY-19
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-MAY-19
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	09-MAY-19
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	09-MAY-19
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-MAY-19
WG3043727-1 LCS								
Benzene			104.2		%		70-130	09-MAY-19
Ethylbenzene			99.7		%		70-130	09-MAY-19
m+p-Xylenes			98.9		%		70-130	09-MAY-19
o-Xylene			99.4		%		70-130	09-MAY-19
Toluene			100.4		%		70-130	09-MAY-19
WG3043727-2 MB								
Benzene			<0.50		ug/L		0.5	09-MAY-19
Ethylbenzene			<0.50		ug/L		0.5	09-MAY-19
m+p-Xylenes			<0.40		ug/L		0.4	09-MAY-19
o-Xylene			<0.30		ug/L		0.3	09-MAY-19
Toluene			<0.50		ug/L		0.5	09-MAY-19
Surrogate: 1,4-Difluorobenzene			100.4		%		70-130	09-MAY-19
Surrogate: 4-Bromofluorobenzene			98.8		%		70-130	09-MAY-19
WG3043727-5 MS		**WG3043727-3**						
Benzene			105.2		%		50-140	09-MAY-19
Ethylbenzene			98.1		%		50-140	09-MAY-19
m+p-Xylenes			98.0		%		50-140	09-MAY-19
o-Xylene			98.1		%		50-140	09-MAY-19
Toluene			99.4		%		50-140	09-MAY-19
Batch R4630513								
WG3043730-1 LCS								
Benzene			103.4		%		70-130	10-MAY-19
Ethylbenzene			100.5		%		70-130	10-MAY-19
m+p-Xylenes			100.3		%		70-130	10-MAY-19
o-Xylene			99.2		%		70-130	10-MAY-19
Toluene			100.9		%		70-130	10-MAY-19
WG3043730-2 MB								
Benzene			<0.50		ug/L		0.5	10-MAY-19

Quality Control Report

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Water**							
Batch R4630513								
WG3043730-2 MB								
Ethylbenzene			<0.50		ug/L		0.5	10-MAY-19
m+p-Xylenes			<0.40		ug/L		0.4	10-MAY-19
o-Xylene			<0.30		ug/L		0.3	10-MAY-19
Toluene			<0.50		ug/L		0.5	10-MAY-19
Surrogate: 1,4-Difluorobenzene			101.2		%		70-130	10-MAY-19
Surrogate: 4-Bromofluorobenzene			99.0		%		70-130	10-MAY-19
F1-HS-511-WT	**Water**							
Batch R4629341								
WG3043727-4 DUP		**WG3043727-3**						
F1 (C6-C10)		<25	32	RPD-NA	ug/L	N/A	30	09-MAY-19
WG3043727-1 LCS								
F1 (C6-C10)			97.0		%		80-120	09-MAY-19
WG3043727-2 MB								
F1 (C6-C10)			<25		ug/L		25	09-MAY-19
Surrogate: 3,4-Dichlorotoluene			120.0		%		60-140	09-MAY-19
WG3043727-5 MS		**WG3043727-3**						
F1 (C6-C10)			87.3		%		60-140	09-MAY-19
Batch R4630513								
WG3043730-1 LCS								
F1 (C6-C10)			104.3		%		80-120	10-MAY-19
WG3043730-2 MB								
F1 (C6-C10)			<25		ug/L		25	10-MAY-19
Surrogate: 3,4-Dichlorotoluene			109.3		%		60-140	10-MAY-19
F2-F4-511-WT	**Water**							
Batch R4626848								
WG3042835-2 LCS								
F2 (C10-C16)			100.8		%		70-130	07-MAY-19
F3 (C16-C34)			101.2		%		70-130	07-MAY-19
F4 (C34-C50)			105.0		%		70-130	07-MAY-19
WG3042835-1 MB								
F2 (C10-C16)			<100		ug/L		100	07-MAY-19
F3 (C16-C34)			<250		ug/L		250	07-MAY-19
F4 (C34-C50)			<250		ug/L		250	07-MAY-19
Surrogate: 2-Bromobenzotrifluoride			94.4		%		60-140	07-MAY-19

Quality Control Report

Workorder: L2268140 Report Date: 23-MAY-19

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

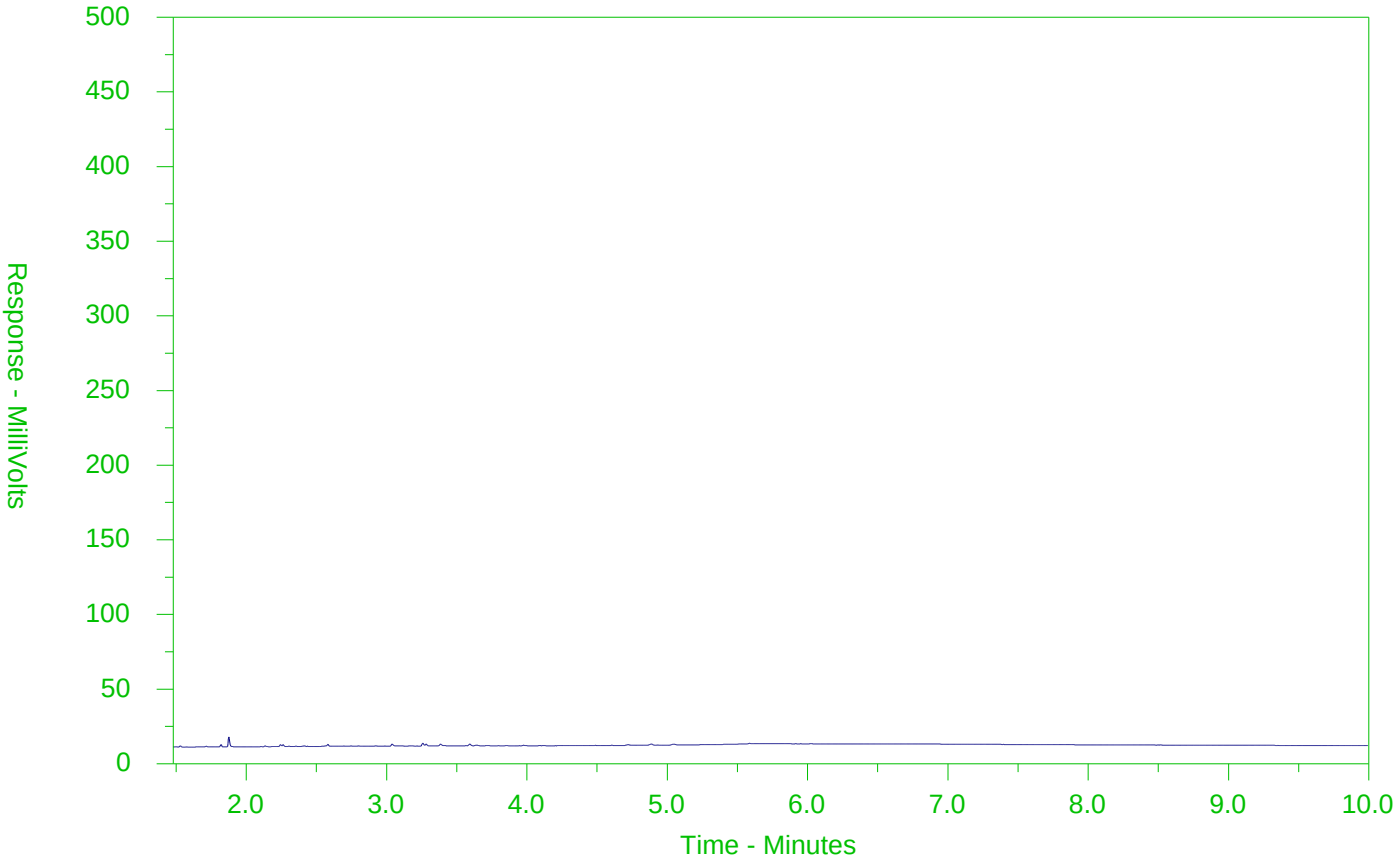
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2268140-1
Client Sample ID: SI-3965 COLUMN 1 EFFLUENT 2MAY2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

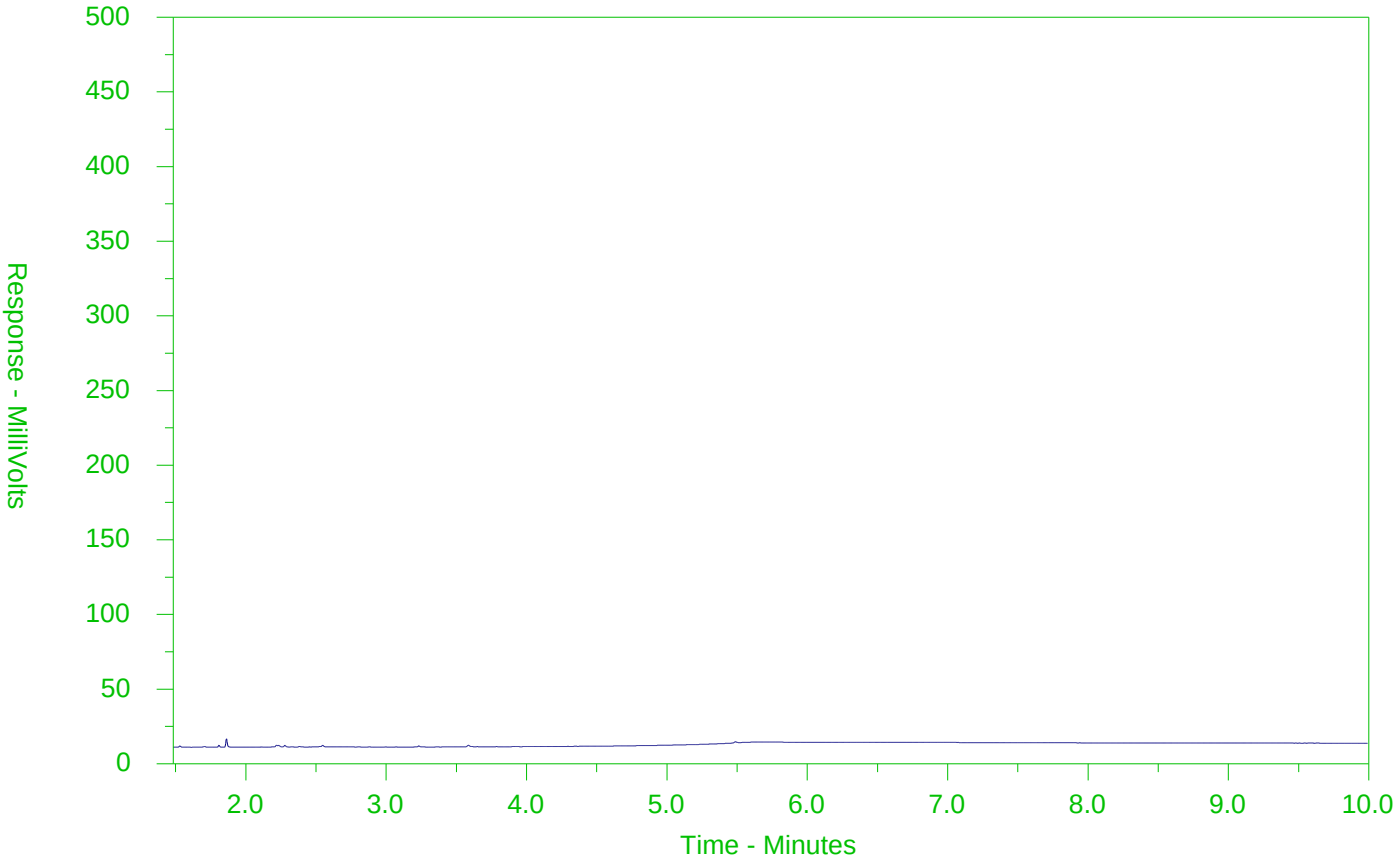
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2268140-2
Client Sample ID: SI-3965 COLUMN 2 EFFLUENT 2MAY2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

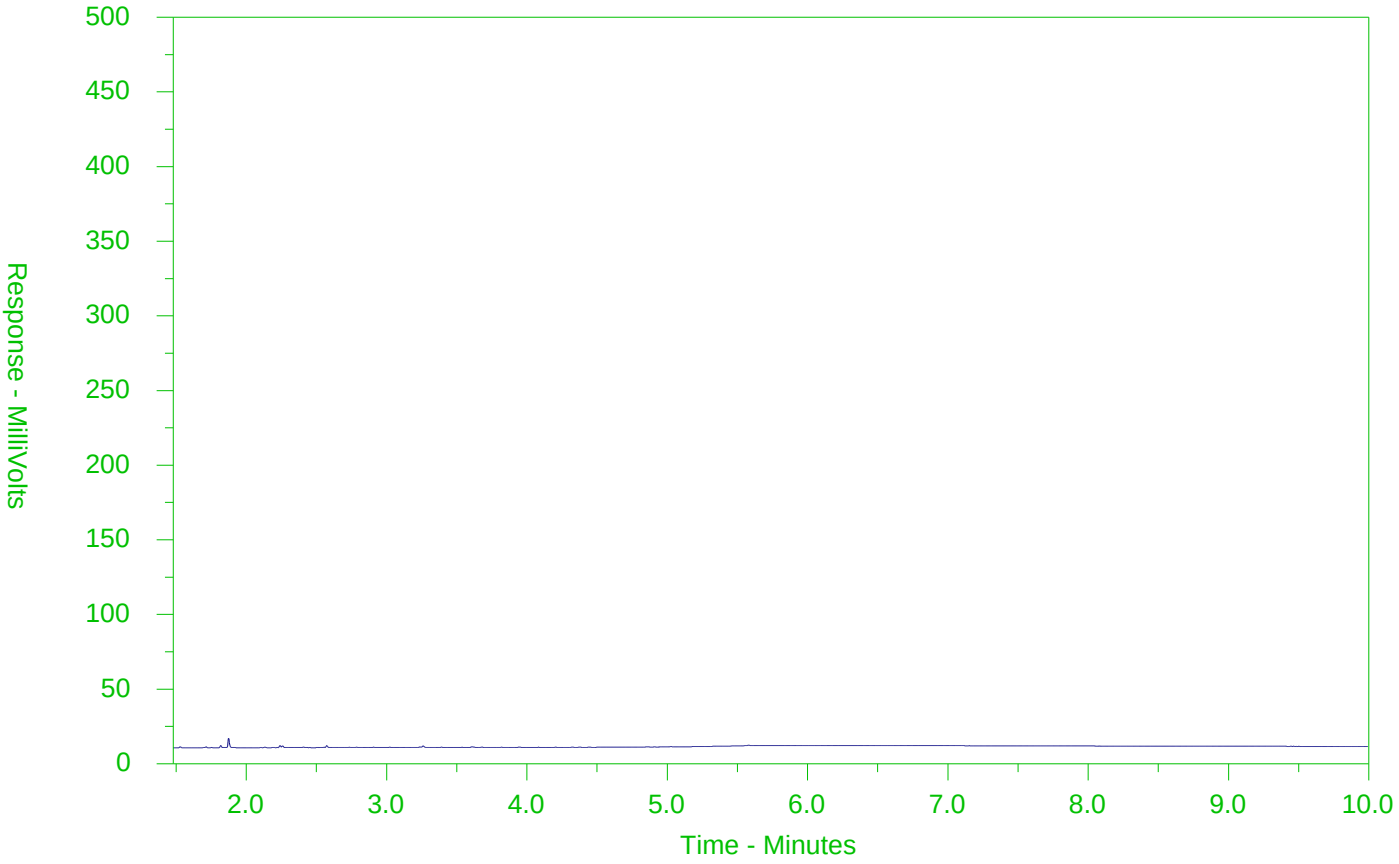
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2268140-3
Client Sample ID: SI-3965 COLUMN 3 EFFLUENT 2MAY2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

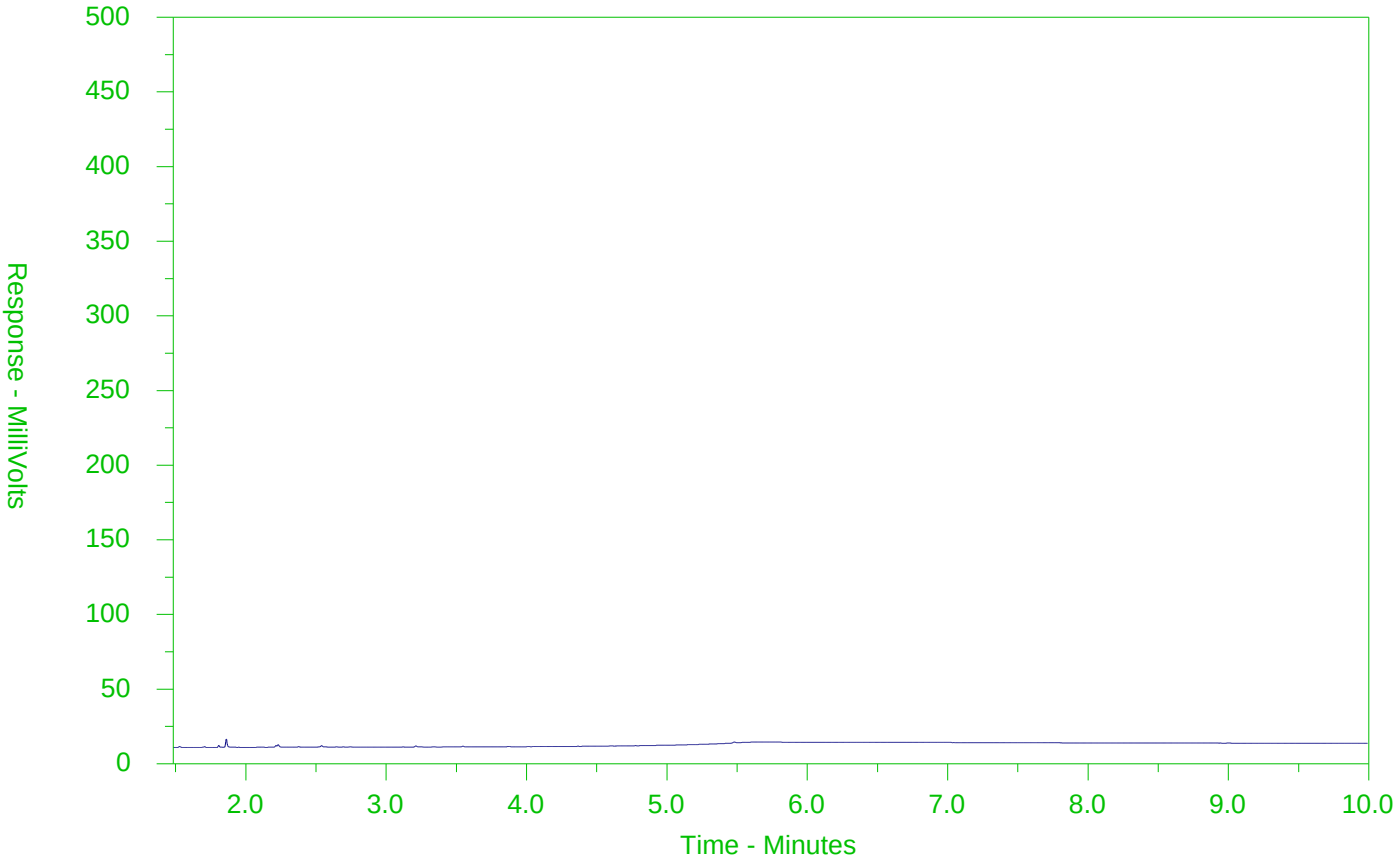
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2268140-4
Client Sample ID: SI-3965 INFLUENT 2MAY2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

L2268140-COFC

Number 19 -

Page 1 of 1

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Report To	
Report To	Rita Schofield
Company:	SIREM
Contact:	Rita Schofield
Address:	130 Stone Road West, Guelph, ON N1G 3Z2
Phone:	(519) 822-2265

Report Format / Distribution

Select Report Format: ☑ PDF ☐ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☐ Yes ☐ No

☐ Criteria on Report - provide details below if box checked

Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax RSchofield@Siremlab.com

Email 2 SSands@Siremlab.com

Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)

R ☑ Regular (Standard TAT if received by 3 pm - business days)

P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT

E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT

E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge

Specify Date Required for E2,E or P:

Invoice To	
Invoice To	Same as Report To ☑ Yes ☐ No
	Copy of Invoice with Report ☑ Yes ☐ No
Company:	SiREM Laboratory
Contact:	Karen Broersma

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax kbroersma@siremlab.com

Email 2 AccountsPayableCan@Siremlab.com

Project Information

ALS Quote #:	Q73124
Job #:	Si-3965
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

Approver ID:		Cost Center:	
GL Account:		Routing Code:	
Activity Code:			
Location:			

ALS Lab Work Order # (lab use only): L2268140

ALS Contact: Gayle Braun | Sampler: Rita Schofield

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BTEX,F1	F2-F4	Number of Containers
	Si-3965 Column 1 Effluent 2May2019	2-May-19	12:00	Water	R	R	2
	Si-3965 Column 2 Effluent 2May2019	2-May-19	12:00	Water	R	R	2
	Si-3965 Column 3 Effluent 2May2019	2-May-19	12:00	Water	R	R	2
	Si-3965 Influent 2May2019	2-May-19	12:00	Water	R	R	2

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ Yes ☑ No

Are samples for human drinking water use? ☐ Yes ☑ No

Special Instructions / Specify Criteria to add on report (client Use)

To ALS Waterloo

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice packs Yes ☑ No ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C | FINAL COOLER TEMPERATURES °C: 5.0

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Rita Schofield (signature)	Date: 5/2/2019	Time: 12:00	Received by:	Date:	Time:	Received by: (signature)	Date: May 6/19	Time: 241

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

SIREM
ATTN: RITA SCHOFIELD
130 Stone Road West
Guelph ON N1G 3Z2

Date Received: 27-MAY-19
Report Date: 31-MAY-19 13:53 (MT)
Version: FINAL

Client Phone: 519-822-2265

Certificate of Analysis

Lab Work Order #: L2279804

Project P.O. #: NOT SUBMITTED
Job Reference: SI-3965
C of C Numbers:
Legal Site Desc:

Gayle Braun
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2279804-1 SI-3965 COLUMN 1 EFFLUENT 22MAY2019 Sampled By: RITA SCHOFIELD on 22-MAY-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		29-MAY-19	R4647608
Ethylbenzene	<0.50		0.50	ug/L		29-MAY-19	R4647608
Toluene	<0.50		0.50	ug/L		29-MAY-19	R4647608
o-Xylene	<0.30		0.30	ug/L		29-MAY-19	R4647608
m+p-Xylenes	<0.40		0.40	ug/L		29-MAY-19	R4647608
Xylenes (Total)	<0.50		0.50	ug/L		29-MAY-19	
Surrogate: 4-Bromofluorobenzene	106.4		70-130	%		29-MAY-19	R4647608
Surrogate: 1,4-Difluorobenzene	100.7		70-130	%		29-MAY-19	R4647608
Hydrocarbons							
F1 (C6-C10)	90		25	ug/L		29-MAY-19	R4647608
F1-BTEX	90		25	ug/L		29-MAY-19	
F2 (C10-C16)	<100		100	ug/L	27-MAY-19	28-MAY-19	R4646097
F3 (C16-C34)	<250		250	ug/L	27-MAY-19	28-MAY-19	R4646097
F4 (C34-C50)	<250		250	ug/L	27-MAY-19	28-MAY-19	R4646097
Total Hydrocarbons (C6-C50)	<370		370	ug/L		29-MAY-19	
Chrom. to baseline at nC50	YES				27-MAY-19	28-MAY-19	R4646097
Surrogate: 2-Bromobenzotrifluoride	92.7		60-140	%	27-MAY-19	28-MAY-19	R4646097
Surrogate: 3,4-Dichlorotoluene	105.9		60-140	%		29-MAY-19	R4647608
L2279804-2 SI-3965 COLUMN 2 EFFLUENT 22MAY2019 Sampled By: RITA SCHOFIELD on 22-MAY-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50	VOCHS	0.50	ug/L		29-MAY-19	R4647608
Ethylbenzene	<0.50	VOCHS	0.50	ug/L		29-MAY-19	R4647608
Toluene	<0.50	VOCHS	0.50	ug/L		29-MAY-19	R4647608
o-Xylene	<0.30	VOCHS	0.30	ug/L		29-MAY-19	R4647608
m+p-Xylenes	<0.40	VOCHS	0.40	ug/L		29-MAY-19	R4647608
Xylenes (Total)	<0.50		0.50	ug/L		29-MAY-19	
Surrogate: 4-Bromofluorobenzene	100.5		70-130	%		29-MAY-19	R4647608
Surrogate: 1,4-Difluorobenzene	101.7		70-130	%		29-MAY-19	R4647608
Hydrocarbons							
F1 (C6-C10)	<25	VOCHS	25	ug/L		29-MAY-19	R4647608
F1-BTEX	<25		25	ug/L		29-MAY-19	
F2 (C10-C16)	<100		100	ug/L	27-MAY-19	28-MAY-19	R4646097
F3 (C16-C34)	<250		250	ug/L	27-MAY-19	28-MAY-19	R4646097
F4 (C34-C50)	<250		250	ug/L	27-MAY-19	28-MAY-19	R4646097
Total Hydrocarbons (C6-C50)	<370		370	ug/L		29-MAY-19	
Chrom. to baseline at nC50	YES				27-MAY-19	28-MAY-19	R4646097
Surrogate: 2-Bromobenzotrifluoride	101.2		60-140	%	27-MAY-19	28-MAY-19	R4646097
Surrogate: 3,4-Dichlorotoluene	104.5		60-140	%		29-MAY-19	R4647608
L2279804-3 SI-3965 COLUMN 3 EFFLUENT 22MAY2019 Sampled By: RITA SCHOFIELD on 22-MAY-19 @ 12:00							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2279804-3 SI-3965 COLUMN 3 EFFLUENT 22MAY2019 Sampled By: RITA SCHOFIELD on 22-MAY-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	0.51		0.50	ug/L		29-MAY-19	R4647608
Ethylbenzene	<0.50		0.50	ug/L		29-MAY-19	R4647608
Toluene	0.57		0.50	ug/L		29-MAY-19	R4647608
o-Xylene	<0.30		0.30	ug/L		29-MAY-19	R4647608
m+p-Xylenes	<0.40		0.40	ug/L		29-MAY-19	R4647608
Xylenes (Total)	<0.50		0.50	ug/L		29-MAY-19	
Surrogate: 4-Bromofluorobenzene	99.9		70-130	%		29-MAY-19	R4647608
Surrogate: 1,4-Difluorobenzene	100.0		70-130	%		29-MAY-19	R4647608
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		29-MAY-19	R4647608
F1-BTEX	<25		25	ug/L		29-MAY-19	
F2 (C10-C16)	<100		100	ug/L	27-MAY-19	28-MAY-19	R4646097
F3 (C16-C34)	<250		250	ug/L	27-MAY-19	28-MAY-19	R4646097
F4 (C34-C50)	<250		250	ug/L	27-MAY-19	28-MAY-19	R4646097
Total Hydrocarbons (C6-C50)	<370		370	ug/L		29-MAY-19	
Chrom. to baseline at nC50	YES				27-MAY-19	28-MAY-19	R4646097
Surrogate: 2-Bromobenzotrifluoride	94.4		60-140	%	27-MAY-19	28-MAY-19	R4646097
Surrogate: 3,4-Dichlorotoluene	101.9		60-140	%		29-MAY-19	R4647608
L2279804-4 SI-3965 INFLUENT 22MAY2019 Sampled By: RITA SCHOFIELD on 22-MAY-19 @ 12:00 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		29-MAY-19	R4647608
Ethylbenzene	<0.50		0.50	ug/L		29-MAY-19	R4647608
Toluene	<0.50		0.50	ug/L		29-MAY-19	R4647608
o-Xylene	<0.30		0.30	ug/L		29-MAY-19	R4647608
m+p-Xylenes	<0.40		0.40	ug/L		29-MAY-19	R4647608
Xylenes (Total)	<0.50		0.50	ug/L		29-MAY-19	
Surrogate: 4-Bromofluorobenzene	100.0		70-130	%		29-MAY-19	R4647608
Surrogate: 1,4-Difluorobenzene	100.1		70-130	%		29-MAY-19	R4647608
Hydrocarbons							
F1 (C6-C10)	196		25	ug/L		29-MAY-19	R4647608
F1-BTEX	196		25	ug/L		29-MAY-19	
F2 (C10-C16)	<100		100	ug/L	27-MAY-19	28-MAY-19	R4646097
F3 (C16-C34)	<250		250	ug/L	27-MAY-19	28-MAY-19	R4646097
F4 (C34-C50)	<250		250	ug/L	27-MAY-19	28-MAY-19	R4646097
Total Hydrocarbons (C6-C50)	<370		370	ug/L		29-MAY-19	
Chrom. to baseline at nC50	YES				27-MAY-19	28-MAY-19	R4646097
Surrogate: 2-Bromobenzotrifluoride	95.8		60-140	%	27-MAY-19	28-MAY-19	R4646097
Surrogate: 3,4-Dichlorotoluene	100.0		60-140	%		29-MAY-19	R4647608

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
VOCHS	VOC analysis was conducted for a water sample that contained > 5% headspace. Results may be biased low.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTX-511-HS-WT	Water	BTEX by Headspace	SW846 8260 (511)

BTX is determined by analyzing by headspace-GC/MS.

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2279804 Report Date: 31-MAY-19

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: RITA SCHOFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Water**							
Batch R4647608								
WG3060022-4 DUP		**WG3060022-3**						
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	29-MAY-19
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	29-MAY-19
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	29-MAY-19
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	29-MAY-19
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	29-MAY-19
WG3060022-1 LCS								
Benzene			103.9		%		70-130	28-MAY-19
Ethylbenzene			100.7		%		70-130	28-MAY-19
m+p-Xylenes			100.1		%		70-130	28-MAY-19
o-Xylene			99.5		%		70-130	28-MAY-19
Toluene			102.7		%		70-130	28-MAY-19
WG3060022-2 MB								
Benzene			<0.50		ug/L		0.5	29-MAY-19
Ethylbenzene			<0.50		ug/L		0.5	29-MAY-19
m+p-Xylenes			<0.40		ug/L		0.4	29-MAY-19
o-Xylene			<0.30		ug/L		0.3	29-MAY-19
Toluene			<0.50		ug/L		0.5	29-MAY-19
Surrogate: 1,4-Difluorobenzene			99.2		%		70-130	29-MAY-19
Surrogate: 4-Bromofluorobenzene			97.3		%		70-130	29-MAY-19
WG3060022-5 MS		**WG3060022-3**						
Benzene			104.7		%		50-140	29-MAY-19
Ethylbenzene			96.7		%		50-140	29-MAY-19
m+p-Xylenes			97.6		%		50-140	29-MAY-19
o-Xylene			97.1		%		50-140	29-MAY-19
Toluene			99.8		%		50-140	29-MAY-19
F1-HS-511-WT	**Water**							
Batch R4647608								
WG3060022-4 DUP		**WG3060022-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	29-MAY-19
WG3060022-1 LCS								
F1 (C6-C10)			98.6		%		80-120	28-MAY-19
WG3060022-2 MB								
F1 (C6-C10)			<25		ug/L		25	29-MAY-19
Surrogate: 3,4-Dichlorotoluene			99.4		%		60-140	29-MAY-19
WG3060022-5 MS		**WG3060022-3**						

Quality Control Report

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: RITA SCHOFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Water**							
Batch R4647608								
WG3060022-5 MS		**WG3060022-3**						
F1 (C6-C10)			96.0		%		60-140	29-MAY-19
F2-F4-511-WT	**Water**							
Batch R4646097								
WG3059853-2 LCS								
F2 (C10-C16)			101.8		%		70-130	28-MAY-19
F3 (C16-C34)			105.1		%		70-130	28-MAY-19
F4 (C34-C50)			109.0		%		70-130	28-MAY-19
WG3059853-1 MB								
F2 (C10-C16)			<100		ug/L		100	28-MAY-19
F3 (C16-C34)			<250		ug/L		250	28-MAY-19
F4 (C34-C50)			<250		ug/L		250	28-MAY-19
Surrogate: 2-Bromobenzotrifluoride			92.7		%		60-140	28-MAY-19

Quality Control Report

Workorder: L2279804 Report Date: 31-MAY-19

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: RITA SCHOFIELD

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

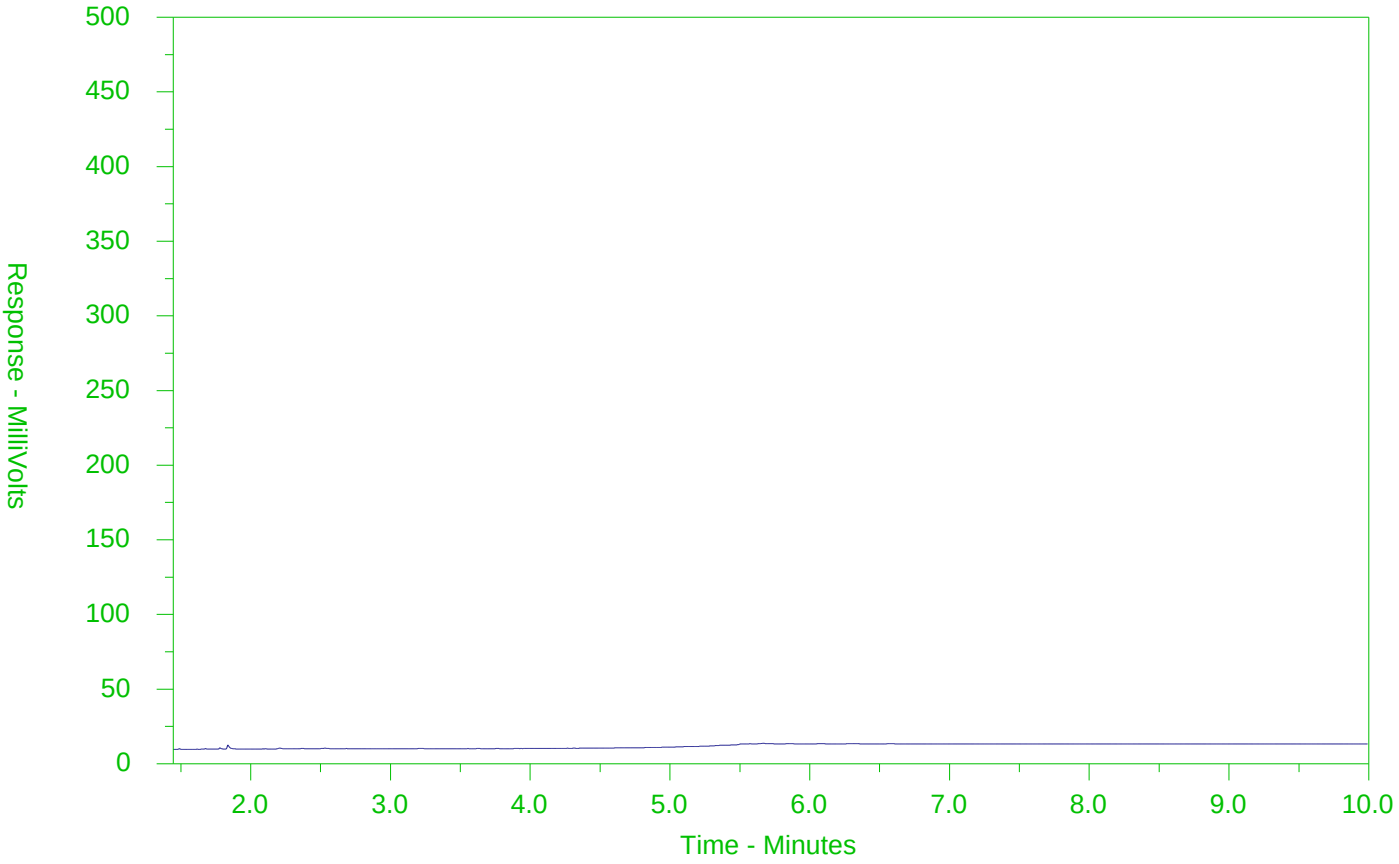
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2279804-1
Client Sample ID: SI-3965 COLUMN 1 EFFLUENT 22MAY2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

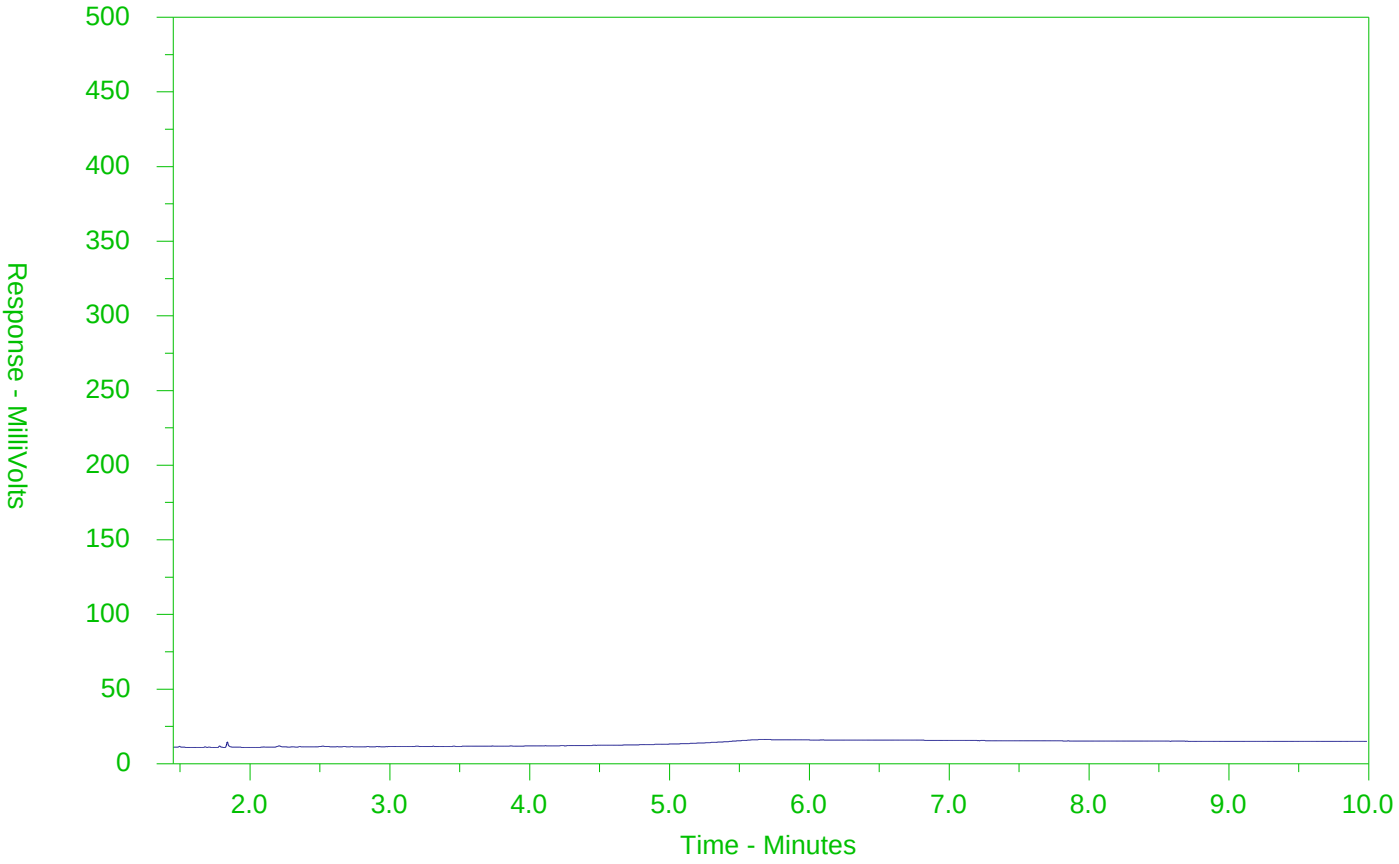
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2279804-2
Client Sample ID: SI-3965 COLUMN 2 EFFLUENT 22MAY2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

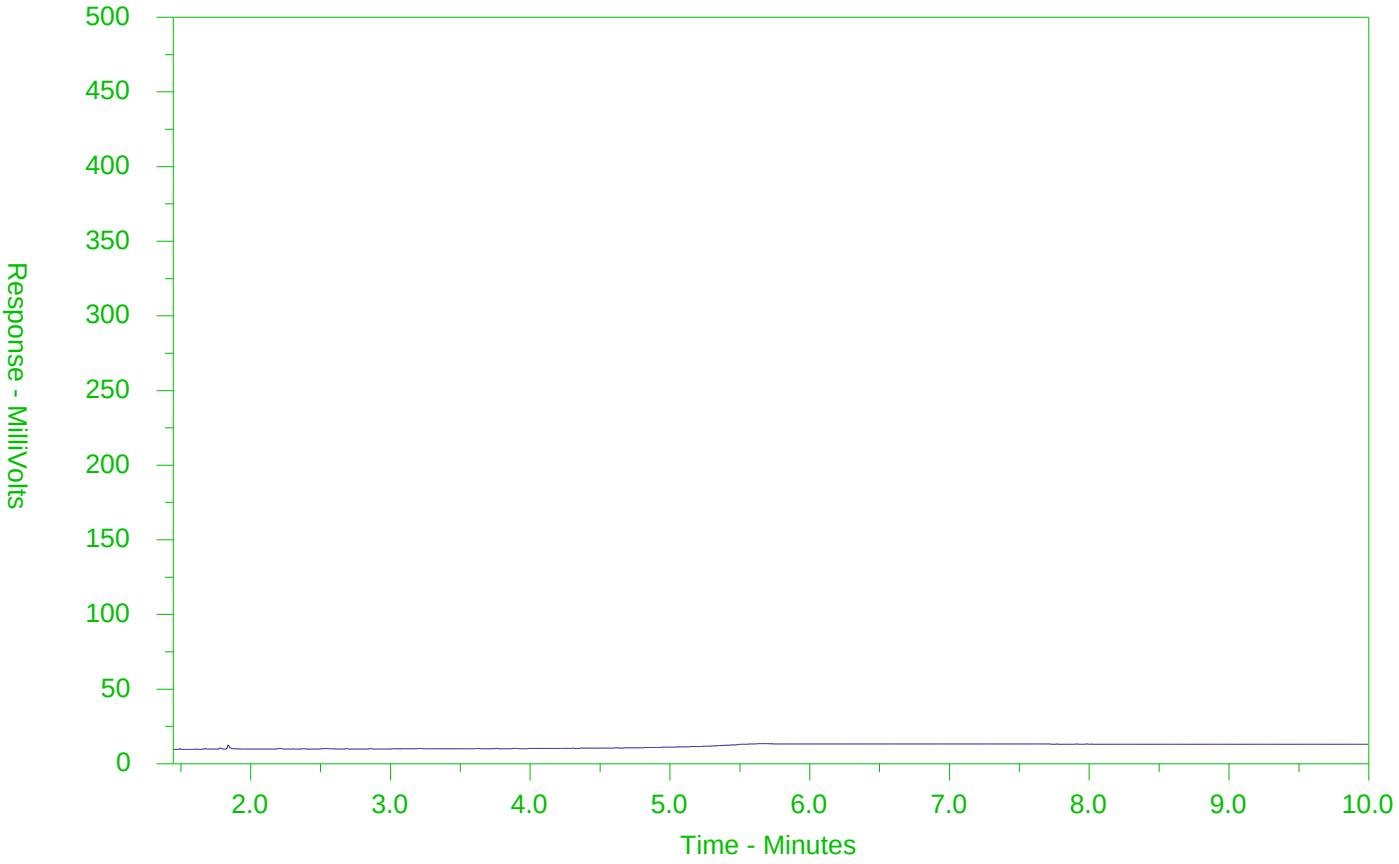
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2279804-3
Client Sample ID: SI-3965 COLUMN 3 EFFLUENT 22MAY2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

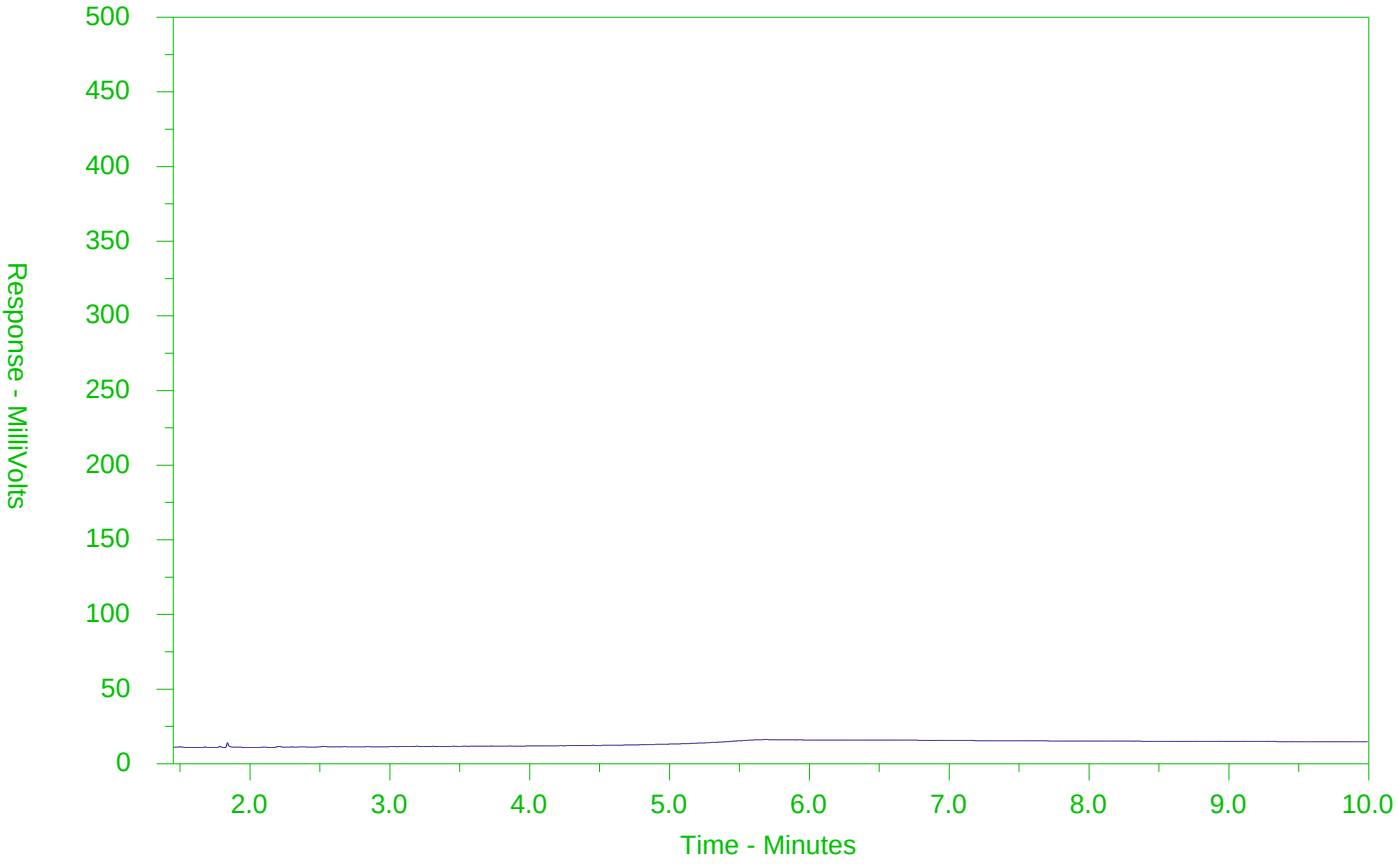
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2279804-4
Client Sample ID: SI-3965 INFLUENT 22MAY2019



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytica Request Form

L2279804-COFC

Canada Toll Free: 1 800 668 9878

Number: 19 -

Page 1 of 1

Report To	Rita Schofield
Company:	SiREM
Contact:	Rita Schofield
Address:	130 Stone Road West Guelph, ON N1G 3Z2
Phone:	(519) 822-2265

Report Format / Distribution

Select Report Format: ☑ PDF ☐ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☐ Yes ☐ No

☐ Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: RSchofield@Siremlab.com

Email 2: SSande@Siremlab.com

Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)

R ☑ Regular (Standard TAT if received by 3 pm - business days)

P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT

E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT

E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge

Specify Date Required for E2,E or P.

Invoice To	Same as Report To ☑ Yes ☐ No
	Copy of Invoice with Report ☑ Yes ☐ No
Company:	SiREM Laboratory
Contact:	Karen Broersma

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: kbroersma@siremlab.com

Email 2: AccountsPayableCan@Siremlab.com

Project Information

ALS Quote #:	Q73124
Job #:	SI-3965
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

Approver ID:	Cost Center:
GL Account:	Routing Code:
Activity Code:	
Location:	

ALS Lab Work Order # (lab use only): L2279804

ALS Contact: Gayle Braun **Sampler:** Rita Schofield

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BTEX,F1	F2-F4	Number of Containers
1	SI-3965 Column 1 Effluent 22May2019	22-May-19	12:00	Water	R	R	2
2	SI-3965 Column 2 Effluent 22May2019	22-May-19	12:00	Water	R	R	2
3	SI-3965 Column 3 Effluent 22May2019	22-May-19	12:00	Water	R	R	2
4	SI-3965 Influent 22May2019	22-May-19	12:00	Water	R	R	2

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ Yes ☑ No

Are samples for human drinking water use? ☐ Yes ☑ No

Special Instructions / Specify Criteria to add on report (client Use)

To ALS Waterloo

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice packs Yes ☑ No ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			9.4		

SHIPMENT RELEASE (client use)

Rita Schofield	5/27/2019	12:00

INITIAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:
	275.19	15:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

SIREM
ATTN: Rita Schofield
130 Stone Road West
Guelph ON N1G 3Z2

Date Received: 16-JUL-19
Report Date: 23-JUL-19 06:29 (MT)
Version: FINAL

Client Phone: 519-822-2265

Certificate of Analysis

Lab Work Order #: L2310730

Project P.O. #: NOT SUBMITTED
Job Reference: SI-3965
C of C Numbers:
Legal Site Desc:

Gayle Braun
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2310730-1 S#2229-1 Sampled By: RITA SCHOLFIELD on 16-JUL-19 @ 09:00 Matrix: SOLID							
Physical Tests							
% Moisture	<0.10		0.10	%	17-JUL-19	18-JUL-19	R4714171
Volatile Organic Compounds							
Benzene	0.0129	VOCJ	0.0068	ug/g	18-JUL-19	20-JUL-19	R4718891
Ethylbenzene	<0.018	VOCJ	0.018	ug/g	18-JUL-19	20-JUL-19	R4718891
Toluene	0.160	VOCJ	0.080	ug/g	18-JUL-19	20-JUL-19	R4718891
o-Xylene	0.021	VOCJ	0.020	ug/g	18-JUL-19	20-JUL-19	R4718891
m+p-Xylenes	0.055	VOCJ	0.030	ug/g	18-JUL-19	20-JUL-19	R4718891
Xylenes (Total)	0.075		0.050	ug/g		20-JUL-19	
Surrogate: 4-Bromofluorobenzene	91.4		50-140	%	18-JUL-19	20-JUL-19	R4718891
Surrogate: 1,4-Difluorobenzene	97.6		50-140	%	18-JUL-19	20-JUL-19	R4718891
Hydrocarbons							
F1 (C6-C10)	<5.0	VOCJ	5.0	ug/g	18-JUL-19	20-JUL-19	R4718891
F1-BTEX	<5.0		5.0	ug/g		20-JUL-19	
F2 (C10-C16)	<10		10	ug/g	17-JUL-19	17-JUL-19	R4714519
F3 (C16-C34)	<50		50	ug/g	17-JUL-19	17-JUL-19	R4714519
F4 (C34-C50)	<50		50	ug/g	17-JUL-19	17-JUL-19	R4714519
Total Hydrocarbons (C6-C50)	<72		72	ug/g		20-JUL-19	
Chrom. to baseline at nC50	YES				17-JUL-19	17-JUL-19	R4714519
Surrogate: 2-Bromobenzotrifluoride	84.4		60-140	%	17-JUL-19	17-JUL-19	R4714519
Surrogate: 3,4-Dichlorotoluene	91.0		60-140	%	18-JUL-19	20-JUL-19	R4718891
L2310730-2 S#2229-2 Sampled By: RITA SCHOLFIELD on 16-JUL-19 @ 09:00 Matrix: SOLID							
Physical Tests							
% Moisture	<0.10		0.10	%	17-JUL-19	18-JUL-19	R4714171
Volatile Organic Compounds							
Benzene	0.0150	VOCJ	0.0068	ug/g	18-JUL-19	20-JUL-19	R4718891
Ethylbenzene	0.019	VOCJ	0.018	ug/g	18-JUL-19	20-JUL-19	R4718891
Toluene	0.200	VOCJ	0.080	ug/g	18-JUL-19	20-JUL-19	R4718891
o-Xylene	0.025	VOCJ	0.020	ug/g	18-JUL-19	20-JUL-19	R4718891
m+p-Xylenes	0.065	VOCJ	0.030	ug/g	18-JUL-19	20-JUL-19	R4718891
Xylenes (Total)	0.090		0.050	ug/g		20-JUL-19	
Surrogate: 4-Bromofluorobenzene	92.2		50-140	%	18-JUL-19	20-JUL-19	R4718891
Surrogate: 1,4-Difluorobenzene	100.4		50-140	%	18-JUL-19	20-JUL-19	R4718891
Hydrocarbons							
F1 (C6-C10)	<5.0	VOCJ	5.0	ug/g	18-JUL-19	20-JUL-19	R4718891
F1-BTEX	<5.0		5.0	ug/g		20-JUL-19	
F2 (C10-C16)	<10		10	ug/g	17-JUL-19	17-JUL-19	R4714519
F3 (C16-C34)	<50		50	ug/g	17-JUL-19	17-JUL-19	R4714519
F4 (C34-C50)	<50		50	ug/g	17-JUL-19	17-JUL-19	R4714519
Total Hydrocarbons (C6-C50)	<72		72	ug/g		20-JUL-19	
Chrom. to baseline at nC50	YES				17-JUL-19	17-JUL-19	R4714519

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2310730-2 S#2229-2 Sampled By: RITA SCHOLFIELD on 16-JUL-19 @ 09:00 Matrix: SOLID							
Hydrocarbons							
Surrogate: 2-Bromobenzotrifluoride	82.8		60-140	%	17-JUL-19	17-JUL-19	R4714519
Surrogate: 3,4-Dichlorotoluene	90.8		60-140	%	18-JUL-19	20-JUL-19	R4718891

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
VOCC	Soil jar was submitted as VOC sample container. VOC results may be biased low, and do not meet federal (CCME) or provincial requirements (for BC, AB-Tier1, MB, ON, SK).

Sample Parameter Qualifier key listed:

Qualifier	Description
VOCJ	Soil jar was submitted as VOC sample container. VOC results may be biased low, and do not meet federal (CCME) or provincial requirements (for BC, AB-Tier1, MB, ON, SK).

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTX-511-HS-WT	Soil	BTEX-O.Reg 153/04 (July 2011)	SW846 8260

BTX is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Soil	F2-F4-O.Reg 153/04 (July 2011)	CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)

Reference Information

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2310730 Report Date: 23-JUL-19

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Soil**							
Batch R4718891								
WG3108448-4 DUP		**WG3108448-3**						
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	20-JUL-19
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	20-JUL-19
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	20-JUL-19
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	20-JUL-19
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	20-JUL-19
WG3108448-2 LCS								
Benzene			94.8		%		70-130	19-JUL-19
Ethylbenzene			94.1		%		70-130	19-JUL-19
m+p-Xylenes			87.7		%		70-130	19-JUL-19
o-Xylene			92.5		%		70-130	19-JUL-19
Toluene			94.5		%		70-130	19-JUL-19
WG3108448-1 MB								
Benzene			<0.0068		ug/g		0.0068	19-JUL-19
Ethylbenzene			<0.018		ug/g		0.018	19-JUL-19
m+p-Xylenes			<0.030		ug/g		0.03	19-JUL-19
o-Xylene			<0.020		ug/g		0.02	19-JUL-19
Toluene			<0.080		ug/g		0.08	19-JUL-19
Surrogate: 1,4-Difluorobenzene			103.4		%		50-140	19-JUL-19
Surrogate: 4-Bromofluorobenzene			95.8		%		50-140	19-JUL-19
WG3108448-5 MS		**L2309977-7**						
Benzene			93.5		%		60-140	20-JUL-19
Ethylbenzene			89.6		%		60-140	20-JUL-19
m+p-Xylenes			84.5		%		60-140	20-JUL-19
o-Xylene			86.0		%		60-140	20-JUL-19
Toluene			92.1		%		60-140	20-JUL-19
F1-HS-511-WT	**Soil**							
Batch R4718891								
WG3108448-4 DUP		**WG3108448-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	20-JUL-19
WG3108448-2 LCS								
F1 (C6-C10)			108.7		%		80-120	19-JUL-19
WG3108448-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	19-JUL-19
Surrogate: 3,4-Dichlorotoluene			122.0		%		60-140	19-JUL-19
WG3108448-6 MS		**L2310310-5**						

Quality Control Report

Workorder: L2310730 Report Date: 23-JUL-19

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Soil**							
Batch R4718891								
WG3108448-6 MS		**L2310310-5**						
F1 (C6-C10)			95.9		%		60-140	20-JUL-19
F2-F4-511-WT	**Soil**							
Batch R4714519								
WG3107178-3 DUP		**WG3107178-5**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	30	17-JUL-19
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	30	17-JUL-19
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	30	17-JUL-19
WG3107178-2 LCS								
F2 (C10-C16)			95.9		%		80-120	17-JUL-19
F3 (C16-C34)			95.4		%		80-120	17-JUL-19
F4 (C34-C50)			96.2		%		80-120	17-JUL-19
WG3107178-1 MB								
F2 (C10-C16)			<10		ug/g		10	17-JUL-19
F3 (C16-C34)			<50		ug/g		50	17-JUL-19
F4 (C34-C50)			<50		ug/g		50	17-JUL-19
Surrogate: 2-Bromobenzotrifluoride			74.0		%		60-140	17-JUL-19
WG3107178-4 MS		**WG3107178-5**						
F2 (C10-C16)			97.4		%		60-140	17-JUL-19
F3 (C16-C34)			96.1		%		60-140	17-JUL-19
F4 (C34-C50)			88.0		%		60-140	17-JUL-19
MOISTURE-WT	**Soil**							
Batch R4714171								
WG3107473-3 DUP		**L2311214-3**						
% Moisture		2.72	2.82		%	3.8	20	18-JUL-19
WG3107473-2 LCS								
% Moisture			100.9		%		90-110	18-JUL-19
WG3107473-1 MB								
% Moisture			<0.10		%		0.1	18-JUL-19

Quality Control Report

Workorder: L2310730 Report Date: 23-JUL-19

Client: SIREM
130 Stone Road West
Guelph ON N1G 3Z2
Contact: Rita Schofield

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

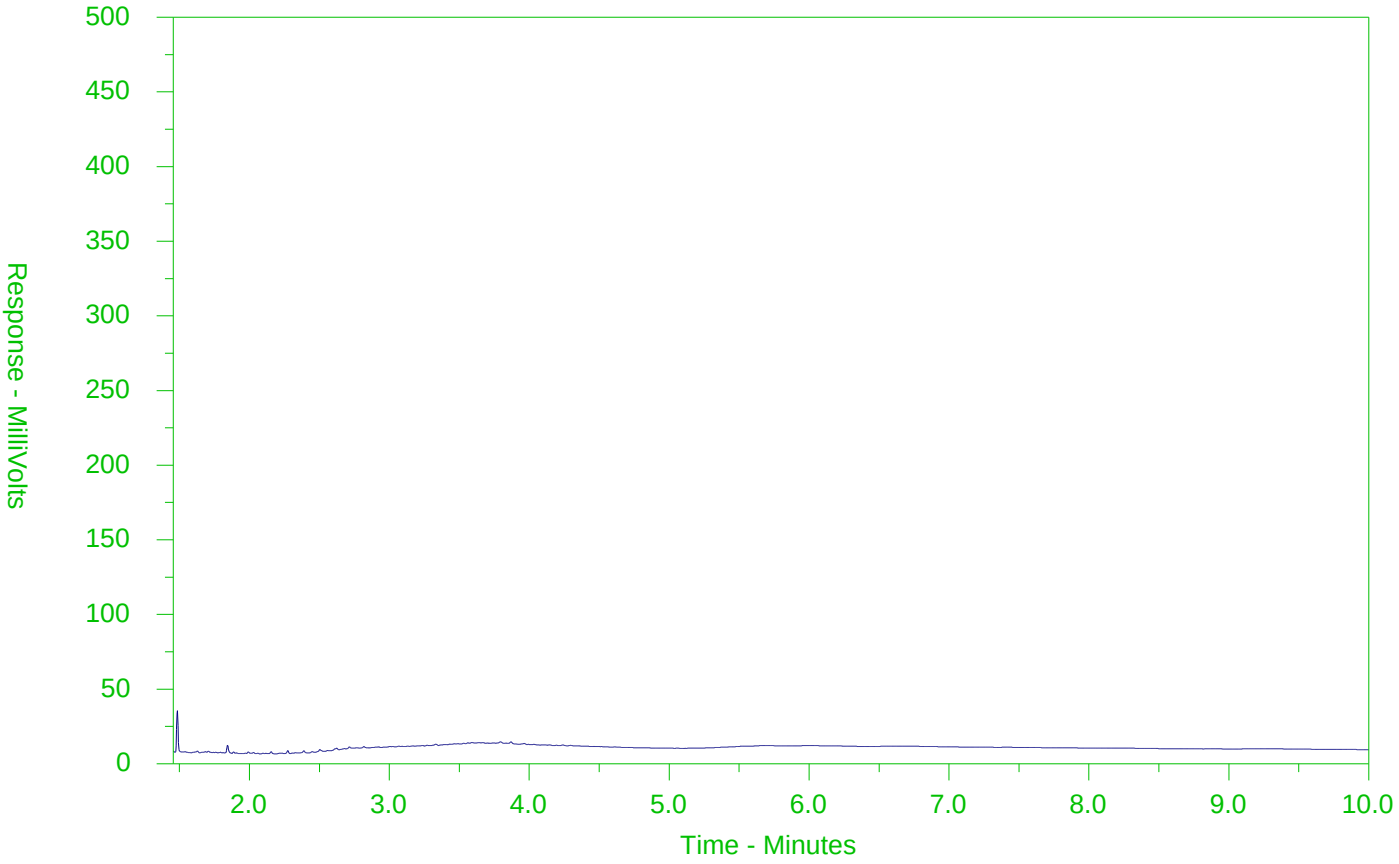
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2310730-1
Client Sample ID: S#2229-1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

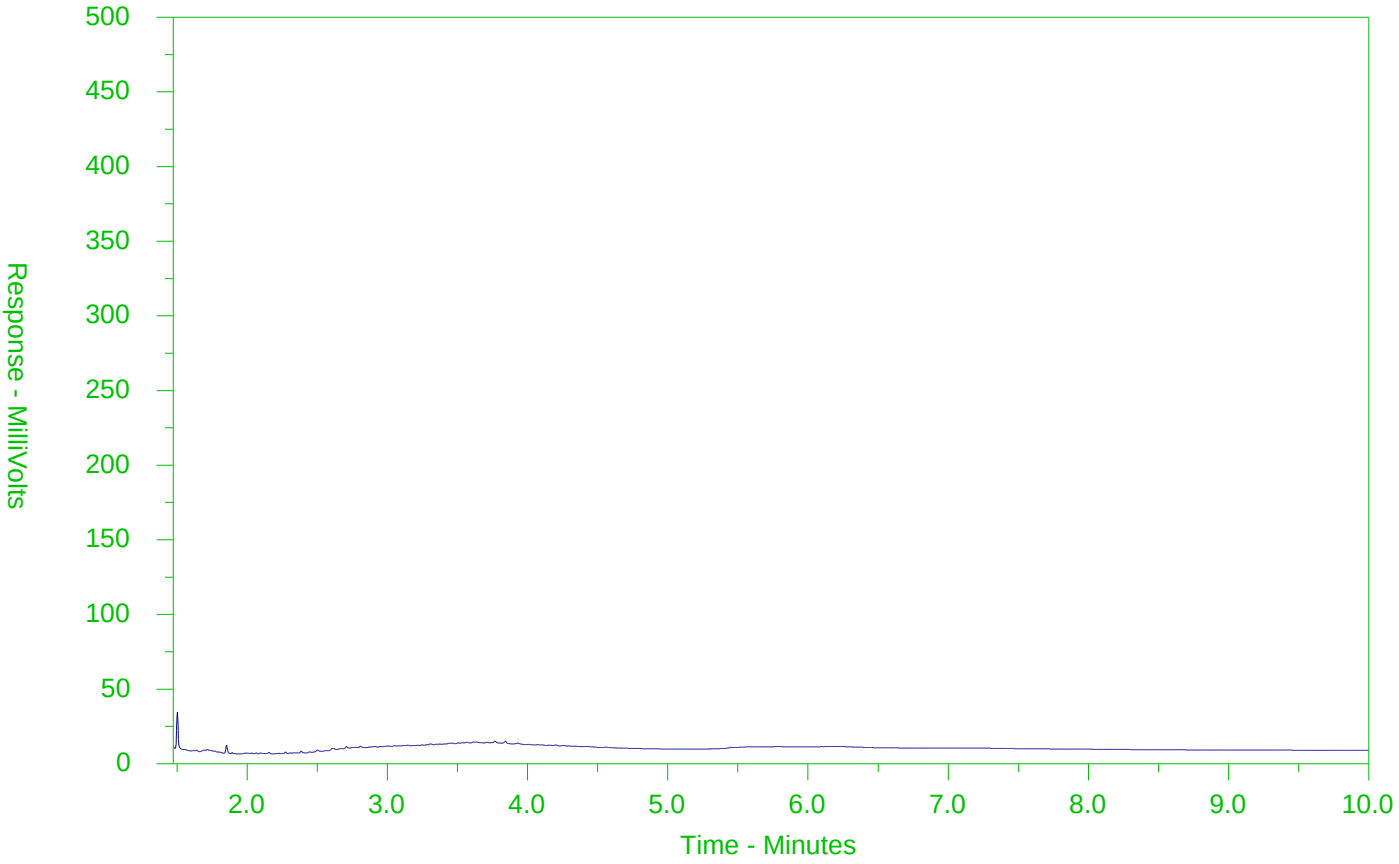
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2310730-2
Client Sample ID: S#2229-2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

L2310730-COFC

Canada Toll Free: 1 800 668 9878

Number: 19 -

Page 1 of 1

Report To	Rita Schofield	**Report Format / Distribution**	
Company:	SiREM	Select Report Format: ☑ PDF ☐ EXCEL ☑ DD (DIGITAL)	
Contact:	Rita Schofield	Quality Control (QC) Report with Report ☐ Yes ☐ No	
Address:	130 Stone Road West Guelph, ON N1G 3Z2	☐ Criteria on Report - provide details below if box checked Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	
Phone	(519) 822-2265	Email 1 or Fax: RSchofield@Siremlab.com	
		Email 2: mhealey@siremlab.com	
Invoice To	Same as Report To ☑ Yes ☐ No	**Invoice Distribution**	
	Copy of Invoice with Report ☑ Yes ☐ No	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Company:	SiREM Laboratory	Email 1 or Fax: kbroersma@siremlab.com	
Contact:	Karen Broersma	Email 2: AccountsPayableCan@Siremlab.com	
Project Information		**Oil and Gas Required Fields (client use)**	
ALS Quote #:	Q73124	Approver ID:	Cost Center:
Job #:	Si-3965	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)	L2310730 (16B)	**ALS Contact:** Gayle Braun	**Sampler:** Rita Schofield

Turnaround Time (TAT) is not available for all tests

- R ☑ Regular (Standard TAT if received by 3 pm - business days)
- P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
- E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT
- E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge

Specify Date Required for E2, E or P:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BTEX,F1	F2-F4	Number of Containers
	S#2229-1	16-Jul-19	9:00	Solid	R	R	1
	S#2229-2	16-Jul-19	9:00	Solid	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ Yes ☐ No

Are samples for human drinking water use? ☐ Yes ☐ No

Special Instructions / Specify Criteria to add on report (client Use)

To ALS Waterloo

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐	No ☐	
Ice packs	Yes ☐	No ☐	☑ Custody seal intact	Yes ☐	No ☐
Cooling Initiated	☐				

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			23.9		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Rita Schofield	Date: 6/16/2019	Time: 9:00	Received by:	Date:	Time:	Received by:	Date: JUL 16 19	Time: 15:05

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

SIF

Time Oil Bulk Terminal PPA

Supplemental Upland Remedial Investigation and Feasibility Study

Appendix G
Alternative Cost Estimates

Table G.1
Alternative Summary

Alternative	Restoration Time Frame (years)	Upland Area of Concern				Shoreline Area of Concern		Long-Term Monitoring	Other Professional Services	Cost
		Bulk Terminal Property	Cost	ASKO Property	Cost	East Waterfront Property	Cost			
Alternative A.1	10	Excavate to CULs	$4,882,293	Excavate to CULs	$6,463,313	Excavate to CULs	$373,812	$205,200	$350,000	$16,151,000
Alternative A.2	15	Excavate to RELs	$3,405,290	Excavate to RELs	$4,905,888	Excavate to CULs	$373,812	$290,700	$350,000	$12,244,000
Alternative B	15	ISS to RELs, Limited Excavation	$3,059,554	ISS to RELs, Hotspot Excavation CAA-5	$2,229,382	Excavate to CULs	$373,812	$290,700	$350,000	$8,251,000
Alternative C	15	ISS in CAA-2.a, Floyd|Snider-proposed limits for other CAAs	$2,700,414	ISS to RELs, Hotspot Excavation CAA-5	$2,262,024	Excavate to CULs, includes additional excavation for new diesel-range-organics REL	$373,812	$290,700	$350,000	$7,821,000
Alternative D	15	Excavate to RELs	$2,104,470	ERH	$2,537,630	Excavate to CULs	$373,812	$290,700	$356,000	$7,404,000
Alternative E	15	ISS to RELs, Limited Excavation	$2,195,703	ISS to RELs	$1,938,630	Excavate to CULs	$373,812	$290,700	$350,000	$6,727,000

Abbreviations:

CAA Cleanup action area
CUL Cleanup level
ERD Enhanced reductive dechlorination
ERH Electrical resistance heating
ISS In situ solidification and stabilization
REL Remediation level

Table G.2
Alternative A.1—Soil Excavation to Meet CULs

Bulk Terminal Property—Excavation						
Task #	**Task List**	**Quantity**	**Unit**	**Unit Rate**	**Total**	**Notes**
	Site Prep and Environmental Controls					
	Mobilization	1	LS	$ 15,000	$ 15,000	Project experience
	Survey	8	Each	$ 1,000	$ 8,000	Two surveys per excavation area
	TESC and Pollution Prevention	1	LS	$ 10,000	$ 10,000	Based on contractor quote
	Stockpile Construction and Management	1	LS	$ 20,000	$ 20,000	Project experience
	Odor Control Foam Machine Rental	1	Month	$ 1,200	$ 1,200	Estimate from Geosyntec
	Odor Control Rusmar Foam	6	Drum	$ 540	$ 3,240	Quote from Rusmar
	Construction					
	Well Decommissioning	16	Each	$ 500	$ 8,000	Project experience
	Concrete/Asphalt Demolition and Disposal	3,973	SY	$ 15.80	$ 62,773	RSMeans 024113175200
	Shoring	4,800	SF	$ 27.50	$ 132,000	RSMeans 3141161600
	Dewatering	1	LS	$ 25,000	$ 25,000	Project experience
	Utility Decommission and Removal	1	LS	$ 20,000	$ 20,000	Project experience
	Utility Protection	1	LS	$ 10,000	$ 10,000	Project experience
	Excavate, Segregate & Stockpile Soil	35,190	Ton	$ 9	$ 316,710	Contractor quote, 1.7 tons/CY conversion factor
	Contingency Excavate, Segregate & Stockpile Soil	7,038	Ton	$ 9	$ 63,342	20% of baseline quantity
	Load, Transport & Dispose Subtitle D	35,190	Ton	$ 67	$ 2,357,730	Contractor quote
	Contingency Load, Transport & Dispose Subtitle D	7,038	Ton	$ 67	$ 471,546	20% of baseline quantity
	LNAPL Vacuuming	5	Day	$ 1,160.00	$ 5,800	Project experience
	LNAPL Disposal	20,000	Gal	$ 0.38	$ 7,600	Project experience
	Backfill and Compact	35,190	Ton	$ 29	$ 1,020,510	Contractor quote
	Contingency Backfill and Compact	7,038	Ton	$ 29	$ 204,102	20% of baseline quantity
	Restore ROW with Aspahlt	996	SY	$ 65	$ 64,740	Project experience
	Building Demolition			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Paving			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Engineering Services					
	Construction Oversight and Analytical Sampling	5	Week	$ 11,000	$ 55,000	Weekly cost based on one field engineer and PM @ 10 hr/wk
				SUBTOTAL	**$ 4,882,293**	

ASKO Property—Excavation						
Task #	**Task List**	**Quantity**	**Unit**	**Unit Rate**	**Total**	**Notes**
	Site Prep and Environmental Controls					
	Mobilization	1	LS	$ -	$ -	Mobilization cost included in BT. Assume concurrent mobilization.
	Survey	8	Each	$ 1,000	$ 8,000	Two surveys per excavation area
	TESC and Pollution Prevention	1	LS	$ 10,000	$ 10,000	Based on contractor quote
	Stockpile Construction and Management	1	LS	$ 20,000	$ 20,000	Project experience
	Odor Control Foam Machine Rental	2	Month	$ 1,200	$ 2,400	Estimate from Geosyntec
	Odor Control Rusmar Foam	6	Drum	$ 540	$ 3,240	Quote from Rusmar, added contingency costs
	Construction					
	Well Decommissioning	30	Each	$ 500	$ 15,000	Project experience
	Concrete/Asphalt Demolition and Disposal	2,946	SY	$ 15.80	$ 46,547	RSMeans 024113175200
	Shoring	2600	SF	$ 28.50	$ 74,100	RSMeans 3141161900
	Dewatering	1	LS	$ 100,000	$ 100,000	Project experience
	Excavate, Segregate & Stockpile Soil	34,170	Ton	$ 9	$ 307,530	Contractor quote, 1.7 tons/CY conversion factor
	Contingency Excavate, Segregate & Stockpile Soil	6834	Ton	$ 9	$ 61,506	20% of baseline quantity
	Load, Transport & Dispose Subtitle D	27336	Ton	$ 67	$ 1,831,512	Contractor quote
	Contingency Load, Transport & Dispose Subtitle D	5467	Ton	$ 67	$ 366,302	20% of baseline quantity
	Load, Transport & Dispose Hazardous	6834	Ton	$ 225	$ 1,537,650	Contractor quote
	Contingency Load, Transport & Dispose Hazardous	1367	Ton	$ 225	$ 307,530	20% of baseline quantity
	Backfill and Compact	34,170	Ton	$ 29	$ 990,930	Contractor quote
	Contingency Backfill and Compact	6834	Ton	$ 29	$ 198,186	20% of baseline quantity
	Building Demolition			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Paving			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Vapor Intrusion Assessment and Vapor Barrier Installation			$ -	$ -	Not included in FS cost, applicable to all alternatives
	PRB Construction					
	Additional Mob for PRB Wall	1	LS	$ 45,000	$ 45,000	Geosyntec estimate
	ZVI Purchase	405	Ton	$ 900	$ 364,500	Based on ZVI 0.075 Tons/CF conversion (2.025 Tons/CY).
	Installation	1,800	SF	$ 42	$ 75,600	Geosyntec estimate
	Load, Transport & Dispose Subtitle D	340	Ton	$ 67.00	$ 22,780	Contractor quote, 1.7 tons/CY conversion factor
	Column Test	1	LS	$ 20,000	$ 20,000	Geosyntec estimate
	Engineering Services					
	Construction Oversight and Analytical Sampling	5	Week	$ 11,000	$ 55,000	Weekly cost based on one field engineer and PM @ 10 hr/wk
				SUBTOTAL	**$ 6,463,313**	

East Waterfront Property—Excavation						
Task #	**Task List**	**Quantity**	**Unit**	**Unit Rate**	**Total**	**Notes**
	Site Prep and Environmental Controls					
	Mobilization	1	LS	$ 12,000	$ 12,000	Contractor quote
	Survey	6	Each	$ 1,000	$ 6,000	Two surveys per excavation area
	TESC and Pollution Prevention	1	LS	$ 10,000	$ 10,000	Project experience, increased TESC cost for shoreline work
	Stockpile Construction and Management	1	LS	$ 10,000	$ 10,000	Project experience
	Construction					
	Well Decommissioning	5	Each	$ 500	$ 2,500	Project experience
	Dewatering Contingency	1	LS	$ 20,000	$ 20,000	Project experience
	Excavate, Segregate & Stockpile Soil	2,312	Ton	$ 9	$ 20,808	Contractor quote, 1.7 tons/CY conversion factor
	Contingency Excavate, Segregate & Stockpile Soil	462	Ton	$ 9	$ 4,162	20% of baseline quantity
	Load, Transport & Dispose Subtitle D	2,312	Ton	$ 67	$ 154,904	Contractor quote
	Contingency Load, Transport & Dispose Subtitle D	462	Ton	$ 67	$ 30,981	20% of baseline quantity
	Backfill and Compact	2,312	Ton	$ 29	$ 67,048	Contractor quote
	Contingency Backfill and Compact	462	Ton	$ 29	$ 13,410	20% of baseline quantity
	Building Demolition			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Engineering Services					
	Construction Oversight and Analytical Sampling	2	Week	$ 11,000	$ 22,000	Weekly cost based on one field engineer and PM @ 10 hr/wk
				SUBTOTAL	**$ 373,812**	

Direct Costs	$ 11,720,000
Seattle Sales Tax @ 10.1%	$ 1,183,720
Total	$ 12,903,720

Professional Services						
Task #	**Task List**	**Quantity**	**Unit**	**Unit Rate**	**Total**	**Notes**
	Engineering Design				$ 150,000	Project experience
	Ecology Review Costs				$ 30,000	Project experience
	Construction Reporting				$ 50,000	Project experience
	Institutional Controls Development and Implementation				$ 30,000	Project experience
	Permitting				$ 75,000	Project experience (ROW permit, shoreline permit, etc.)
	Well Installation	5	Each	$ 3,000	$ 15,000	Project experience
	Long-Term Monitoring (Semiannual for 2 years, Annual for 8 years)	12	Event	$ 17,100	$ 205,200	Project experience

Base Total	$ 13,458,920
20% Contingency	$ 2,691,784
Total	$ 16,151,000

Table G.3
Alternative A.2—Soil Excavation to Meet RELs

Bulk Terminal Property—Excavation						
Task #	**Task List**	**Quantity**	**Unit**	**Unit Rate**	**Total**	**Notes**
	Site Prep and Environmental Controls					
	Mobilization	1	LS	$ 15,000	$ 15,000	Project experience
	Survey	8	Each	$ 1,000	$ 8,000	Two surveys per excavation area
	TESC and Pollution Prevention	1	LS	$ 10,000	$ 10,000	Based on contractor quote
	Stockpile Construction and Management	1	LS	$ 20,000	$ 20,000	Project experience
	Odor Control Foam Machine Rental	1	Month	$ 1,200	$ 1,200	Estimate from Geosyntec
	Odor Control Rusmar Foam	6	Drum	$ 540	$ 3,240	Quote from Rusmar
	Construction					
	Well Decommissioning	16	Each	$ 500	$ 8,000	Project experience
	Concrete/Asphalt Demolition and Disposal	2,800	SY	$ 15.80	$ 44,240	RSMeans 024113175200
	Shoring	3,000	SF	$ 27.50	$ 82,500	RSMeans 3141161600
	Dewatering	1	LS	$ 25,000	$ 25,000	Project experience
	Utility Decommission and Removal	1	LS	$ 20,000	$ 20,000	Project experience
	Utility Protection	1	LS	$ 10,000	$ 10,000	Project experience
	Excavate, Segregate & Stockpile Soil	24,310	Ton	$ 9	$ 218,790	Contractor quote, 1.7 tons/CY conversion factor
	Contingency Excavate, Segregate & Stockpile Soil	4,862	Ton	$ 9	$ 43,758	20% of baseline quantity
	Load, Transport & Dispose Subtitle D	24,310	Ton	$ 67	$ 1,628,770	Contractor quote
	Contingency Load, Transport & Dispose Subtitle D	4,862	Ton	$ 67	$ 325,754	20% of baseline quantity
	LNAPL Vacuuming	5	Day	$ 1,160	$ 5,800	Project experience
	LNAPL Disposal	20,000	Gal	$ 0.38	$ 7,600	Project experience
	Backfill and Compact	24,310	Ton	$ 29	$ 704,990	Contractor quote
	Contingency Backfill and Compact	4,862	Ton	$ 29	$ 140,998	20% of baseline quantity
	Restore ROW with Aspahlt	410	SY	$ 65	$ 26,650	Project experience
	Building Demolition			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Paving			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Engineering Services					
	Construction Oversight and Analytical Sampling	5	Week	$ 11,000	$ 55,000	Weekly cost based on one field engineer and PM @ 10 hr/wk
				SUBTOTAL	**$ 3,405,290**	

ASKO Property—Excavation						
Task #	**Task List**	**Quantity**	**Unit**	**Unit Rate**	**Total**	**Notes**
	Site Prep and Environmental Controls					
	Mobilization	1	LS	$ -	$ -	Mobilization cost included in BT. Assume concurrent mobilization.
	Survey	8	Each	$ 1,000	$ 8,000	Two surveys per excavation area
	TESC and Pollution Prevention	1	LS	$ 10,000	$ 10,000	Based on contractor quote
	Stockpile Construction and Management	1	LS	$ 20,000	$ 20,000	Project experience
	Odor Control Foam Machine Rental	1	Month	$ 1,200	$ 1,200	Estimate from Geosyntec
	Odor Control Rusmar Foam	6	Drum	$ 540	$ 3,240	Quote from Rusmar, added contingency costs
	Construction					
	Well Decommissioning	30	Each	$ 500	$ 15,000	Project experience
	Concrete/Asphalt Demolition and Disposal	1,800	SY	$ 15.80	$ 28,440	RSMeans 024113175200
	Shoring	2600	SF	$ 27.50	$ 71,500	RSMeans 3141161900
	Dewatering	1	LS	$ 100,000	$ 100,000	Project experience
	Excavate, Segregate & Stockpile Soil	24,650	Ton	$ 9	$ 221,850	Contractor quote, 1.7 tons/CY conversion factor
	Contingency Excavate, Segregate & Stockpile Soil	4930	Ton	$ 9	$ 44,370	20% of baseline quantity
	Load, Transport & Dispose Subtitle D	19720	Ton	$ 67	$ 1,321,240	Contractor quote
	Contingency Load, Transport & Dispose Subtitle D	3944	Ton	$ 67	$ 264,248	20% of baseline quantity
	Load, Transport & Dispose Hazardous	4930	Ton	$ 225	$ 1,109,250	Contractor quote
	Contingency Load, Transport & Dispose Hazardous	986	Ton	$ 225	$ 221,850	20% of baseline quantity
	Backfill and Compact	24,650	Ton	$ 29	$ 714,850	Contractor quote
	Contingency Backfill and Compact	4930	Ton	$ 29	$ 142,970	20% of baseline quantity
	Building Demolition			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Paving			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Vapor Intrusion Assessment and Vapor Barrier Installation			$ -	$ -	Not included in FS cost, applicable to all alternatives
	PRB Construction					
	Additional Mob for PRB Wall	1	LS	$ 45,000	$ 45,000	Geosyntec estimate
	ZVI Purchase	405	Ton	$ 900	$ 364,500	Based on ZVI 0.075 tons/CF conversion (2.025 tons/CY)
	Installation	1,800	SF	$ 42	$ 75,600	Geosyntec estimate
	Load, Transport & Dispose Subtitle D	340	Ton	$ 67	$ 22,780	Contractor quote, 1.7 tons/CY conversion factor
	Column Test	1	LS	$ 20,000	$ 20,000	Geosyntec estimate
	Engineering Services					
	Hot Spot Delineation Investigation	1	LS	$ 20,000	$ 20,000	Project experience
	Laboratory Fees	1	LS	$ 5,000	$ 5,000	Project experience
	Construction Oversight and Analytical Sampling	5	Week	$ 11,000	$ 55,000	Weekly cost based on one field engineer and PM @ 10 hr/wk
				SUBTOTAL	**$ 4,905,888**	

East Waterfront Property—Excavation						
Task #	**Task List**	**Quantity**	**Unit**	**Unit Rate**	**Total**	**Notes**
	Site Prep and Environmental Controls					
	Mobilization	1	LS	$ 12,000	$ 12,000	Contractor quote
	Survey	6	Each	$ 1,000	$ 6,000	Two surveys per excavation area
	TESC and Pollution Prevention	1	LS	$ 10,000	$ 10,000	Project experience, increased TESC cost for shoreline work
	Stockpile Construction and Management	1	LS	$ 10,000	$ 10,000	Project experience
	Construction					
	Well Decommissioning	5	Each	$ 500	$ 2,500	Project experience
	Dewatering Contingency	1	LS	$ 20,000	$ 20,000	Project experience
	Excavate, Segregate & Stockpile Soil	2,312	Ton	$ 9	$ 20,808	Contractor quote, 1.7 tons/CY conversion factor
	Contingency Excavate, Segregate & Stockpile Soil	462	Ton	$ 9	$ 4,162	20% of baseline quantity
	Load, Transport & Dispose Subtitle D	2,312	Ton	$ 67	$ 154,904	Contractor quote
	Contingency Load, Transport & Dispose Subtitle D	462	Ton	$ 67	$ 30,981	20% of baseline quantity
	Backfill and Compact	2,312	Ton	$ 29	$ 67,048	Contractor quote
	Contingency Backfill and Compact	462	Ton	$ 29	$ 13,410	20% of baseline quantity
	Building Demolition			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Engineering Services					
	Construction Oversight and Analytical Sampling	2	Week	$ 11,000	$ 22,000	Weekly cost based on one field engineer and PM @ 10 hr/wk
				SUBTOTAL	**$ 373,812**	

Direct Costs	$ 8,685,000
Seattle Sales Tax @ 10.1%	$ 877,185
Total	$ 9,562,185

Professional Services						
Task #	**Task List**	**Quantity**	**Unit**	**Unit Rate**	**Total**	**Notes**
	Engineering Design				$ 150,000	Project Experience
	Ecology Review Costs				$ 30,000	Project Experience
	Construction Reporting				$ 50,000	Project Experience
	Institutional Controls Development and Implementation				$ 30,000	Project Experience
	Permitting				$ 75,000	Project Experience (ROW permit, shoreline permit, etc.)
	Well Installation	5	Each	$ 3,000	$ 15,000	Project experience
	Long-Term Monitoring (Semiannual for 2 years, Annual for 13 years)	17	Event	$ 17,100	$ 290,700	Project experience

Base Total	$ 10,202,885
20% Contingency	$ 2,040,577
Total	$ 12,244,000

Table G.4
Alternative B—Soil and LNAPL Excavation on BT and ROW, ISS on BT and ASKO, Excavation on EW

Bulk Terminal Property—Excavation						
Task #	Task List	Quantity	Unit	Unit Rate	Total	Notes
	Site Prep and Environmental Controls					
	Mobilization	1	LS	$ 345,700	$ 345,700	ENTACT quote
	Survey	7.5	Week	$ 7,850	$ 58,875	ENTACT quote
	TESC and Pollution Prevention	7.5	Week	$ 1,075	$ 8,063	ENTACT quote - split 50/50 between BT and ASKO
	Stockpile Construction and Management	1	LS	$ 20,000	$ 20,000	Project experience, required for CAA-1 and 3 excavation
	Odor Control Foam Machine Rental	1.5	Month	$ 10,000	$ 15,000	ENTACT quote
	Odor Control Rusmar Foam	20	Drum	$ 540	$ 10,800	Quote from Rusmar
	ISS On Property					
	Well Decommissioning		Each	$ 500	$ -	Included in Excavation Below
	Electrical and Water Service	1	LS	$ 24,350	$ 24,350	ENTACT quote - split 50/50 between BT and ASKO
	ISS Batch Plant, Water Treatment Service Pad	1	LS	$ 42,350	$ 42,350	ENTACT quote - split 50/50 between BT and ASKO
	Water Treatment System Operation and Rental	1.5	Month	$ 39,000	$ 58,500	ENTACT quote
	Utility Capping	1	LS	$ 25,000	$ 25,000	Project experience
	Asphalt/Concrete Demolition and Removal	1,320	SY	$ 15.80	$ 20,856	RSMeans 024113175200
	Bench Excavation for Swell Containment (3 feet bgs)	1,320	CY	$ 19.80	$ 26,136	ENTACT quote
	Pre-Excavation/Debris Removal (10 feet bgs)	3,085	CY	$ 24.00	$ 74,040	ENTACT quote
	ISS Mixing - CAA-2.a	7,933	CY	$ 45.90	$ 364,125	ENTACT quote
	Swell Management	2,380	CY	$ 16.50	$ 39,270	ENTACT quote
	Disposal of Subtitle D Waste	2,244	Ton	$ 67	$ 150,348	ENTACT quote
	Final Grading	1,322	SY	$ 7.50	$ 9,915	ENTACT quote
	Building Demolition		--	$ -	$ -	Not included in FS cost
	Paving		--	$ -	$ -	Not included in FS cost
	ISS Testing					
	UCS Testing	79	Each	$ 125	$ 9,875	Geosyntec estimate - Lab prices
	Permeability Testing	79	Each	$ 275	$ 21,725	Geosyntec estimate - Lab prices
	Equipment for Lab	1	LS	$ -	$ -	Cost included in ASKO estimate
	Sample Shipping	158	Each	$ 8	$ 1,264	Geosyntec estimate
	Excavation					
	Well Decommissioning	16	Each	$ 500	$ 8,000	Project experience
	Concrete/Asphalt Demolition and Disposal	851	SY	$ 15.80	$ 13,448	RSMeans 024113175200
	Shoring	3,000	SF	$ 27.50	$ 82,500	RSMeans 3141161600
	Dewatering	1	LS	$ 25,000	$ 25,000	Project experience
	Utility Protection	1	LS	$ 10,000	$ 10,000	Project experience
	Excavate, Segregate & Stockpile Soil	11,390	Ton	$ 9	$ 102,510	Contractor quote, 1.7 tons/CY conversion factor
	Contingency Excavate, Segregate & Stockpile Soil	2,278	Ton	$ 9	$ 20,502	20% of baseline quantity
	Load, Transport & Dispose Subtitle D	11,390	Ton	$ 67	$ 763,130	Contractor quote
	Contingency Load, Transport & Dispose Subtitle D	2,278	Ton	$ 67	$ 152,626	20% of baseline quantity
	LNAPL Vacuuming	5	Day	$ 1,160	$ 5,800	Project experience
	LNAPL Disposal	5,000	Gal	$ 0.38	$ 1,900	Project experience
	Backfill and Compact	11,390	Ton	$ 29	$ 330,310	Contractor quote
	Contingency Backfill and Compact	2,278	Ton	$ 29	$ 66,062	20% of baseline quantity
	Restore ROW with Aspahlt	405	SY	$ 65	$ 26,325	Project experience
	Building Demolition		--	$ -	$ -	Not included in FS cost, applicable to all alternatives
	Paving		--	$ -	$ -	Not included in FS cost, applicable to all alternatives
	Engineering Services					
	Construction Oversight and Analytical Sampling	7.5	Week	$ 15,000	$ 112,500	Weekly cost based on one field engineer and PM @ 10 hr/wk
	Expenses and Travel	1	LS	$ -	$ -	Cost included in ASKO estimate
	Weekly and Monthly Reporting	7.5	Week	$ 1,700	$ 12,750	Geosyntec estimate
	Final Report	1	LS	$ -	$ -	Cost included in ASKO estimate
				SUBTOTAL	**$ 3,059,554**	

ASKO Property—In Situ Solidification and Stabilization						
Task #	Task List	Quantity	Unit	Unit Rate	Total	Notes
	Site Prep and Environmental Controls					
	Mobilization	1	LS	$ 101,900	$ 101,900	ENTACT quote
	Temp Facilities	14	Week	$ 2,000	$ 28,000	Geosyntec estimate
	Survey	7.5	Week	$ 7,850	$ 58,875	ENTACT quote
	TESC and Pollution Prevention	7.5	Week	$ 1,075	$ 8,063	ENTACT quote - split 50/50 between BT and ASKO
	Odor Control Foam Machine Rental	2	Month	$ 10,000	$ 20,000	ENTACT quote
	Odor Control Rusmar Foam	20	Drum	$ 540	$ 10,800	Quote from Rusmar, added contingency costs
	ISS Construction					
	Well Decommissioning	14	Each	$ 500	$ 7,000	Project experience
	Electrical and Water Service	1	LS	$ 24,350	$ 24,350	ENTACT quote - split 50/50 between BT and ASKO
	ISS Batch Plant, Water Treatment Service Pad	1	LS	$ 42,350	$ 42,350	ENTACT quote - split 50/50 between BT and ASKO
	Water Treatment System Operation and Rental	2	Month	$ 39,000	$ 78,000	ENTACT quote
	Asphalt/Concrete Demolition and Removal	1,722	SY	$ 15.80	$ 27,208	RSMeans 024113175200
	Bench Excavation for Swell Containment (3 feet bgs)	1,722	CY	$ 16.50	$ 28,413	ENTACT quote
	Pre-Excavation/Debris Removal (10 feet bgs)	4,019	CY	$ 22.50	$ 90,428	ENTACT quote
	ISS Mixing - ASKO Site A	14,352	CY	$ 48.10	$ 690,331	ENTACT quote
	Swell Management	4,306	CY	$ 18.5	$ 79,661	ENTACT quote
	Load, Transport & Dispose Subtitle D	2,927	Ton	$ 67	$ 196,109	ENTACT quote
	Final Grading	1,722	SY	$ 7.50	$ 12,915	ENTACT quote
	Building Demolition			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Paving			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Vapor Intrusion Assessment and Vapor Barrier Installation			$ -	$ -	Not included in FS cost, applicable to all alternatives
	ISS Testing					
	UCS Testing	119	Each	$ 125	$ 14,875	Geosyntec estimate - Lab prices
	Permeability Testing	119	Each	$ 275	$ 32,725	Geosyntec estimate - Lab prices
	Equipment for Lab	1	LS	$ 2,000	$ 2,000	Geosyntec estimate - Project experience
	Sample Shipping	238	Each	$ 8	$ 1,904	Geosyntec estimate
	Interceptor Trench Construction					
	Additional Mob for Interceptor Trench	1	LS	$ 71,300	$ 71,300	ENTACT quote
	Pre-Excavation/Obstruction Removal	1	LS	$ 7,300	$ 7,300	ENTACT quote
	PRB Wall Construction Cost	225	VSF	$ 127.8	$ 28,755	ENTACT quote
	Interceptor Trench	134	CY	$ 401	$ 53,734	ENTACT quote
	ZVI Cost	50	Tons	$ 900	$ 45,000	FS Estimate-Note we independently costed this out previously
	Load, Transport & Dispose Subtitle D Waste	155	Tons	$ 67	$ 10,385	ENTACT quote
	Excavation					
	Concrete/Asphalt Demolition and Disposal	778	SY	$ 15.80	$ 12,292	RSMeans 024113175200
	Excavate, Segregate & Stockpile Soil	2,210	Ton	$ 9	$ 19,890	Contractor quote, 1.7 tons/CY conversion factor
	Contingency Excavate, Segregate & Stockpile Soil	442	Ton	$ 9	$ 3,978	20% of baseline quantity
	Load, Transport & Dispose Subtitle D	2,210	Ton	$ 67	$ 148,070	Contractor quote
	Contingency Load, Transport & Dispose Subtitle D	442	Ton	$ 67	$ 29,614	20% of baseline quantity
	Backfill and Compact	2,210	Ton	$ 29	$ 64,090	Contractor quote
	Contingency Backfill and Compact	442	Ton	$ 29	$ 12,818	20% of baseline quantity
	Building Demolition			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Paving			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Vapor Intrusion Assessment and Vapor Barrier Installation			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Engineering Services					
	Construction Oversight	7.5	Week	$ 15,000	$ 112,500	Geosyntec estimate
	Expenses and Travel	1	LS	$ 11,000	$ 11,000	Geosyntec estimate
	Weekly and Monthly Reporting	7.5	Week	$ 1,700	$ 12,750	Geosyntec estimate
	Final Report	1	LS	$ 30,000	$ 30,000	Geosyntec estimate
				SUBTOTAL	**$ 2,229,382**	

Table G.4
Alternative B—Soil and LNAPL Excavation on BT and ROW, ISS on BT and ASKO, Excavation on EW

East Waterfront Property—Excavation						
Task #	Task List	Quantity	Unit	Unit Rate	Total	Notes
	Site Prep and Environmental Controls					
	Mobilization	1	LS	$ 12,000	$ 12,000	Contractor quote
	Survey	6	Each	$ 1,000	$ 6,000	Two surveys per excavation area
	TESC and Pollution Prevention	1	Month	$ 10,000	$ 10,000	Project experience, increased TESC cost for shoreline work
	Stockpile Construction and Management	1	LS	$ 10,000	$ 10,000	Project experience
	Construction					
	Well Decommissioning	5	Each	$ 500	$ 2,500	Project experience
	Dewatering Contingency	1	LS	$ 20,000	$ 20,000	Project experience
	Excavate, Segregate & Stockpile Soil	2,312	Ton	$ 9	$ 20,808	Contractor quote, 1.7 tons/CY conversion factor
	Contingency Excavate, Segregate & Stockpile Soil	462	Ton	$ 9	$ 4,162	20% of baseline quantity
	Load, Transport & Dispose Subtitle D	2,312	Ton	$ 67	$ 154,904	Contractor quote
	Contingency Load, Transport & Dispose Subtitle D	462	Ton	$ 67	$ 30,981	20% of baseline quantity
	Backfill and Compact	2,312	Ton	$ 29	$ 67,048	Contractor quote
	Contingency Backfill and Compact	462	Ton	$ 29	$ 13,410	20% of baseline quantity
	Building Demolition			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Engineering Services					
	Construction Oversight and Analytical Sampling	2	Week	$ 11,000.00	$ 22,000	Weekly cost based on one field engineer and PM @ 10 hr/wk
				SUBTOTAL	**$ 373,812**	

Direct Costs	$	5,663,000
Seattle Sales Tax @ 10.1%	$	571,963
Total	$	6,234,963

Professional Services						
Task #	Task List	Quantity	Unit	Unit Rate	Total	Notes
	Engineering Design				$ 150,000	Project experience
	Ecology Review Costs				$ 30,000	Project experience
	Construction Reporting				$ 50,000	Project experience
	Institutional Controls Development and Implementation				$ 30,000	Project experience
	Permitting				$ 75,000	Project experience (ROW permit, shoreline permit, etc.)
	Well Installation	5	Each	$ 3,000	$ 15,000	Project experience
	Long-Term Monitoring (Semiannual for 2 years, Annual for 13 years)	17	Event	$ 17,100	$ 290,700	Project experience

Base Total	$	6,875,663
20% Contingency	$	1,375,133
Total	$	8,251,000

Table G.5

Alternative C—Soil and LNAPL Excavation on BT and ROW, ISS on BT and ASKO, Groundwater Treatment and ERD on ASKO, Excavation on EW

Bulk Terminal Property—Excavation						
Task #	Task List	Quantity	Unit	Unit Rate	Total	Notes
	Site Prep and Environmental Controls					
	Mobilization	1	LS	$ 345,700	$ 345,700	ENTACT quote
	Survey	7.5	Week	$ 7,850	$ 58,875	ENTACT quote
	TESC and Pollution Prevention	7.5	LS	$ 1,075	$ 8,063	ENTACT quote - split 50/50 between BT and ASKO
	Stockpile Construction and Management	1	LS	$ 20,000	$ 20,000	Project experience
	Odor Control Foam Machine Rental	2	Month	$ 10,000	$ 20,000	ENTACT quote
	Odor Control Rusmar Foam	20	Drum	$ 540	$ 10,800	Quote from Rusmar
	ISS On Property					
	Well Decommissioning		Each	$ 500	$ -	Included in Excavation Below
	Electrical and Water Service	1	LS	$ 24,350	$ 24,350	ENTACT quote - split 50/50 between BT and ASKO
	ISS Batch Plant, Water Treatment Service Pad	1	LS	$ 42,350	$ 42,350	ENTACT quote - split 50/50 between BT and ASKO
	Water Treatment System Operation and Rental	1.5	Month	$ 39,000	$ 58,500	ENTACT quote
	Utility Capping	1	LS	$ 25,000	$ 25,000	Project experience
	Asphalt/Concrete Demolition and Removal	1,320	SY	$ 15.80	$ 20,856	RSMeans 024113175200
	Bench Excavation for Swell Containment (3 feet bgs)	1,320	CY	$ 19.80	$ 26,136	ENTACT quote
	Pre-Excavation/Debris Removal (10 feet bgs)	3,085	CY	$ 24.00	$ 74,040	ENTACT quote
	ISS Mixing - CAA-2.a	7,933	CY	$ 45.90	$ 364,125	ENTACT quote
	Swell Management	2,380	CY	$ 16.50	$ 39,270	ENTACT quote
	Disposal of Subtitle D Waste	2,244	Ton	$ 67	$ 150,348	ENTACT quote
	Final Grading	1,322	SY	$ 7.50	$ 9,915	ENTACT quote
	Building Demolition		--	$ -	$ -	Not included in FS cost
	Paving		--	$ -	$ -	Not included in FS cost
	ISS Testing					
	UCS Testing	79	Each	$ 125	$ 9,875	Geosyntec estimate - Lab prices
	Permeability Testing	79	Each	$ 275	$ 21,725	Geosyntec estimate - Lab prices
	Equipment for Lab	1	LS	$ -	$ -	Cost included in ASKO estimate
	Sample Shipping	158	Each	$ 8	$ 1,264	Geosyntec estimate
	Excavation					
	Well Decommissioning	16	Each	$ 500	$ 8,000	Project experience
	Concrete/Asphalt Demolition and Disposal	851	SY	$ 15.80	$ 13,448	RSMeans 024113175200
	Shoring	3,000	SF	$ 27.50	$ 82,500	RSMeans 3141161600
	Dewatering	1	LS	$ 25,000	$ 25,000	Project experience
	Utility Protection	1	LS	$ 10,000	$ 10,000	Project experience
	Excavate, Segregate & Stockpile Soil	8,500	Ton	$ 9	$ 76,500	Contractor quote, 1.7 tons/CY conversion factor
	Contingency Excavate, Segregate & Stockpile Soil	1,700	Ton	$ 9	$ 15,300	20% of baseline quantity
	Load, Transport & Dispose Subtitle D	8,500	Ton	$ 67	$ 569,500	Contractor quote
	Contingency Load, Transport & Dispose Subtitle D	1,700	Ton	$ 67	$ 113,900	20% of baseline quantity
	LNAPL Vacuuming	5	Day	$ 1,160	$ 5,800	Project experience
	LNAPL Disposal	5,000	Gal	$ 0.38	$ 1,900	Project experience
	Backfill and Compact	8,500	Ton	$ 29	$ 246,500	Contractor quote
	Contingency Backfill and Compact	1,700	Ton	$ 29	$ 49,300	20% of baseline quantity
	Restore ROW with Aspahlt	405	SY	$ 65	$ 26,325	Project experience
	Building Demolition		--	$ -	$ -	Not included in FS cost, applicable to all alternatives
	Paving		--	$ -	$ -	Not included in FS cost, applicable to all alternatives
	Engineering Services					
	Construction Oversight and Analytical Sampling	7.5	Week	$ 15,000	$ 112,500	Weekly cost based on one field engineer and PM @ 10 hr/wk
	Expenses and Travel	1	LS	$ -	$ -	Cost included in ASKO estimate
	Weekly and Monthly Reporting	7.5	Week	$ 1,700	$ 12,750	Geosyntec estimate
	Final Report	1	LS	$ -	$ -	Cost included in ASKO estimate
				SUBTOTAL	**$ 2,700,414**	

ASKO Property—In Situ Solidification and Stabilization						
Task #	Task List	Quantity	Unit	Unit Rate	Total	Notes
	Site Prep and Environmental Controls					
	Mobilization	1	LS	$ 101,900	$ 101,900	ENTACT quote
	Temp Facilities	14	Week	$ 2,000	$ 28,000	Geosyntec estimate
	Survey	7.5	Week	$ 7,850	$ 58,875	ENTACT quote
	TESC and Pollution Prevention	7.5	LS	$ 1,075	$ 8,063	ENTACT quote - split 50/50 between BT and ASKO
	Odor Control Foam Machine Rental	2	Month	$ 10,000	$ 20,000	ENTACT quote
	Odor Control Rusmar Foam	20	Drum	$ 540	$ 10,800	Quote from Rusmar, added contingency costs
	ISS Construction					
	Well Decommissioning	14	Each	$ 500	$ 7,000	Project experience
	Electrical and Water Service	1	LS	$ 24,350	$ 24,350	ENTACT quote - split 50/50 between BT and ASKO
	ISS Batch Plant, Water Treatment Service Pad	1	LS	$ 42,350	$ 42,350	ENTACT quote - split 50/50 between BT and ASKO
	Water Treatment System Operation and Rental	2	Month	$ 39,000	$ 78,000	ENTACT quote
	Asphalt/Concrete Demolition and Removal	1,722	SY	$ 15.80	$ 27,208	RSMeans 024113175200
	Bench Excavation for Swell Containment (3 feet bgs)	1,722	CY	$ 16.50	$ 28,413	ENTACT quote
	Pre-Excavation/Debris Removal (10 feet bgs)	4,019	CY	$ 22.50	$ 90,428	ENTACT quote
	ISS Mixing - ASKO Site A	14,352	CY	$ 48.10	$ 690,331	ENTACT quote
	Swell Management	4,306	CY	$ 18.5	$ 79,661	ENTACT quote
	Load, Transport & Dispose Subtitle D	2,927	Ton	$ 67	$ 196,109	ENTACT quote
	Final Grading	1,722	SY	$ 7.50	$ 12,915	ENTACT quote
	Building Demolition			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Paving			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Vapor Intrusion Assessment and Vapor Barrier Installation			$ -	$ -	Not included in FS cost, applicable to all alternatives
	ISS Testing					
	UCS Testing	119	Each	$ 125	$ 14,875	Geosyntec estimate - Lab prices
	Permeability Testing	119	Each	$ 275	$ 32,725	Geosyntec estimate - Lab prices
	Equipment for Lab	1	LS	$ 2,000	$ 2,000	Geosyntec estimate - Project experience
	Sample Shipping	238	Each	$ 8	$ 1,904	Geosyntec estimate
	ERD Injections in CAA-5					
	Utility Locate	1	LS	$ 500	$ 500	Project experience
	Injection Well Construction: 25-foot-deep Wells	13	EA	$ 2,800	$ 36,400	Project experience, includes development
	Purchase of EVO Product	31,200	Pound	$ 1.57	$ 48,984	Project experience, quantity based on ~800 pounds/well/injection event
	Bioaugmentation	1	LS	$ 50,000	$ 50,000	Project experience
	Injection Event	3	Event	$ 22,000	$ 66,000	Project experience
	Injection Equipment Rental	3	Event	$ 19,030	$ 57,090	Project experience, includes baker tank, pumps, injection manifolds, hoses
	Laboratory Costs	1	LS	$ 20,000	$ 20,000	Project experience
	Interceptor Trench Construction					
	Additional Mob for Interceptor Trench	1	LS	$ 71,300	$ 71,300	ENTACT quote
	Pre-Excavation/Obstruction Removal	1	LS	$ 7,300	$ 7,300	ENTACT quote
	PRB Wall Construction Cost	225	SF	$ 127.8	$ 28,755	ENTACT quote
	Interceptor Trench	134	CY	$ 401	$ 53,734	ENTACT quote
	ZVI Cost	50	Tons	$ 900	$ 45,000	FS Estimate-Note we independently costed this out previously
	Load, Transport & Dispose Subtitle D Waste	155	Tons	$ 67	$ 10,385	ENTACT quote
	Excavation					
	Concrete/Asphalt Demolition and Disposal	100	SY	$ 15.80	$ 1,580	RSMeans 024113175200
	Excavate, Segregate & Stockpile Soil	340	Ton	$ 9	$ 3,060	Contractor quote, 1.7 tons/CY conversion factor
	Contingency Excavate, Segregate & Stockpile Soil	68	Ton	$ 9	$ 612	20% of baseline quantity
	Load, Transport & Dispose Subtitle D	340	Ton	$ 67	$ 22,780	Contractor quote
	Contingency Load, Transport & Dispose Subtitle D	68	Ton	$ 67	$ 4,556	20% of baseline quantity
	Backfill and Compact	340	Ton	$ 29	$ 9,860	Contractor quote
	Contingency Backfill and Compact	68	Ton	$ 29	$ 1,972	20% of baseline quantity
	Building Demolition			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Paving			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Vapor Intrusion Assessment and Vapor Barrier Installation			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Engineering Services					
	Construction Oversight	7.5	Week	$ 15,000	$ 112,500	Geosyntec estimate
	Expenses and Travel	1	LS	$ 11,000	$ 11,000	Geosyntec estimate
	Weekly and Monthly Reporting	7.5	Week	$ 1,700	$ 12,750	Geosyntec estimate
	Final Report	1	LS	$ 30,000	$ 30,000	Geosyntec estimate
				SUBTOTAL	**$ 2,262,024**	

Table G.5
Alternative C—Soil and LNAPL Excavation on BT and ROW, ISS on BT and ASKO, Groundwater Treatment and ERD on ASKO, Excavation on EW

East Waterfront Property—Excavation						
Task #	Task List	Quantity	Unit	Unit Rate	Total	Notes
	Site Prep and Environmental Controls					
	Mobilization	1	LS	$ 12,000	$ 12,000	Contractor quote
	Survey	6	Each	$ 1,000	$ 6,000	Two surveys per excavation area
	TESC and Pollution Prevention	1	Month	$ 10,000	$ 10,000	Project experience, increased TESC cost for shoreline work
	Stockpile Construction and Management	1	LS	$ 10,000	$ 10,000	Project experience
	Construction					
	Well Decommissioning	5	Each	$ 500	$ 2,500	Project experience
	Dewatering Contingency	1	LS	$ 20,000	$ 20,000	Project experience
	Excavate, Segregate & Stockpile Soil	2,312	Ton	$ 9	$ 20,808	Contractor quote, 1.7 tons/CY conversion factor
	Contingency Excavate, Segregate & Stockpile Soil	462	Ton	$ 9	$ 4,162	20% of baseline quantity
	Load, Transport & Dispose Subtitle D	2,312	Ton	$ 67	$ 154,904	Contractor quote
	Contingency Load, Transport & Dispose Subtitle D	462	Ton	$ 67	$ 30,981	20% of baseline quantity
	Backfill and Compact	2,312	Ton	$ 29	$ 67,048	Contractor quote
	Contingency Backfill and Compact	462	Ton	$ 29	$ 13,410	20% of baseline quantity
	Building Demolition			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Engineering Services					
	Construction Oversight and Analytical Sampling	2	Week	$ 11,000.00	$ 22,000	Weekly cost based on one field engineer and PM @ 10 hr/wk
				SUBTOTAL	**$ 373,812**	

Direct Costs	$	5,337,000
Seattle Sales Tax @ 10.1%	$	539,037
Total	$	5,876,037

Professional Services						
Task #	Task List	Quantity	Unit	Unit Rate	Total	Notes
	Engineering Design				$ 150,000	Project experience
	Ecology Review Costs				$ 30,000	Project experience
	Construction Reporting				$ 50,000	Project experience
	Institutional Controls Development and Implementation				$ 30,000	Project experience
	Permitting				$ 75,000	Project experience (ROW permit, shoreline permit, etc.)
	Well Installation	5	Each	$ 3,000	$ 15,000	Project experience
	Long-Term Monitoring (Semiannual for 2 years, Annual for 13 years)	17	Event	$ 17,100	$ 290,700	Project experience

Base Total	$	6,516,737
20% Contingency	$	1,303,347
Total	$	7,821,000

Table G.6
Alternative D—Soil and LNAPL Excavation on BT and in ROW, ERH (thermal) on ASKO, Excavation on EW

Bulk Terminal Property—Excavation						
Task #	Task List	Quantity	Unit	Unit Rate	Total	Notes
	Site Prep and Environmental Controls					
	Mobilization	1	LS	$ 15,000	$ 15,000	Project experience
	Survey	8	Each	$ 1,000	$ 8,000	Two surveys per excavation area
	TESC and Pollution Prevention	1	LS	$ 10,000	$ 10,000	Based on contractor quote
	Stockpile Construction and Management	1	LS	$ 20,000	$ 20,000	Project experience
	Odor Control Foam Machine Rental	1	Month	$ 1,200	$ 1,200	Estimate from Geosyntec
	Odor Control Rusmar Foam	6	Drum	$ 540	$ 3,240	Quote from Rusmar
	Construction					
	Well Decommissioning	16	Each	$ 500	$ 8,000	Project experience
	Concrete/Asphalt Demolition and Disposal	1,600	SY	$ 15.80	$ 25,280	RSMeans 024113175200
	Shoring	1,800	SF	$ 27.50	$ 49,500	RSMeans 3141161600
	Dewatering	1	LS	$ 25,000	$ 25,000	Project experience
	Utility Decommission and Removal	1	LS	$ 20,000	$ 20,000	Project experience
	Utility Protection	1	LS	$ 10,000	$ 10,000	Project experience
	Excavate, Segregate & Stockpile Soil	14,450	Ton	$ 9	$ 130,050	Contractor quote, 1.7 tons/CY conversion factor
	Contingency Excavate, Segregate & Stockpile Soil	2,890	Ton	$ 9	$ 26,010	20% of baseline quantity
	Load, Transport & Dispose Subtitle D	14,450	Ton	$ 67	$ 968,150	Contractor quote
	Contingency Load, Transport & Dispose Subtitle D	2,890	Ton	$ 67	$ 193,630	20% of baseline quantity
	LNAPL Vacuuming	5	Day	$ 1,160	$ 5,800	Project experience
	LNAPL Disposal	20,000	Gal	$ 0.38	$ 7,600	Project experience
	Backfill and Compact	14,450	Ton	$ 29	$ 419,050	Contractor quote
	Contingency Backfill and Compact	2,890	Ton	$ 29	$ 83,810	20% of baseline quantity
	Restore ROW with Aspahlt	310	SY	$ 65	$ 20,150	Project experience
	Building Demolition			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Paving			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Engineering Services					
	Construction Oversight and Analytical Sampling	5	Week	$ 11,000	$ 55,000	Weekly cost based on one field engineer and PM @ 10 hr/wk
				SUBTOTAL	**$ 2,104,470**	

ASKO Property—Enhanced Reductive Dechlorination						
Task #	Task List	Quantity	Unit	Unit Rate	Total	Notes
	Work By TRS					
	Design, Work Plan, HASP, Permit Assistance	1	LS	$ 79,000	$ 79,000	Estimate provided by TRS
	Mobilization	1	LS	$ 234,000	$ 234,000	Estimate provided by TRS
	Subsurface Installation	1	LS	$ 289,000	$ 289,000	Estimate provided by TRS
	Surface Installation and Start-Up	1	LS	$ 279,000	$ 279,000	Estimate provided by TRS
	Remediation System Operation (4 months)	1	LS	$ 369,000	$ 369,000	Estimate provided by TRS
	Demobilization and Final Report	1	LS	$ 168,000	$ 168,000	Estimate provided by TRS
	Work by Others	1	LS	$ 393,250	$ 393,250	Includes site prep, waste disposal, utilities removal, etc.
	Well Removal	30	Each	$ 750	$ 22,500	Project experience
	Building Demolition			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Paving			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Vapor Intrusion Assessment and Vapor Barrier Installation			$ -	$ -	Not included in FS cost, applicable to all alternatives
	PRB Construction					
	Additional Mob for PRB Wall	1	LS	$ 45,000	$ 45,000	Geosyntec estimate
	ZVI Purchase	405	Ton	$ 900	$ 364,500	Based on ZVI 0.075 tons/CF conversion (2.025 tons/CY)
	Installation	1,800	SF	$ 42	$ 75,600	Geosyntec estimate
	Load, Transport & Dispose Subtitle D	340	Ton	$ 67.00	$ 22,780	Contractor quote, 1.7 tons/CY conversion factor
	Column Test	1	LS	$ 20,000	$ 20,000	Geosyntec estimate
	Engineering Services					
	Installation Oversight and Analytical Sampling	16	Week	$ 11,000	$ 176,000	Project experience
				SUBTOTAL	**$ 2,537,630**	

East Waterfront Property—Excavation						
Task #	Task List	Quantity	Unit	Unit Rate	Total	Notes
	Site Prep and Environmental Controls					
	Mobilization	1	LS	$ 12,000	$ 12,000	Contractor quote
	Survey	6	Each	$ 1,000	$ 6,000	Two surveys per excavation area
	TESC and Pollution Prevention	1	LS	$ 10,000	$ 10,000	Project experience, increased TESC cost for shoreline work
	Stockpile Construction and Management	1	LS	$ 10,000	$ 10,000	Project experience
	Construction					
	Well Decommissioning	5	Each	$ 500	$ 2,500	Project experience
	Dewatering Contingency	1	LS	$ 20,000	$ 20,000	Project experience
	Excavate, Segregate & Stockpile Soil	2,312	Ton	$ 9	$ 20,808	Contractor quote, 1.7 tons/CY conversion factor
	Contingency Excavate, Segregate & Stockpile Soil	462	Ton	$ 9	$ 4,162	20% of baseline quantity
	Load, Transport & Dispose Subtitle D	2,312	Ton	$ 67	$ 154,904	Contractor quote
	Contingency Load, Transport & Dispose Subtitle D	462	Ton	$ 67	$ 30,981	20% of baseline quantity
	Backfill and Compact	2,312	Ton	$ 29	$ 67,048	Contractor quote
	Contingency Backfill and Compact	462	Ton	$ 29	$ 13,410	20% of baseline quantity
	Building Demolition			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Engineering Services					
	Construction Oversight and Analytical Sampling	2	Week	$ 11,000	$ 22,000	Weekly cost based on one field engineer and PM @ 10 hr/wk
				SUBTOTAL	**$ 373,812**	

Direct Costs	$ 5,016,000
Seattle Sales Tax @ 10.1%	$ 506,616
Total	$ 5,522,616

Professional Services						
Task #	Task List	Quantity	Unit	Unit Rate	Total	Notes
	Engineering Design				$ 150,000	Project experience
	Ecology Review Costs				$ 30,000	Project experience
	Construction Reporting				$ 50,000	Project experience
	Institutional Controls Development and Implementation				$ 30,000	Project experience
	Permitting				$ 75,000	Project experience (ROW permit, shoreline permit, etc.)
	Well Installation	7	Each	$ 3,000	$ 21,000	Project experience
	Long-Term Monitoring (Semiannual for 2 years, Annual for 13 years)	17	Event	$ 17,100	$ 290,700	Project experience

Base Total	$ 6,169,316
20% Contingency	$ 1,233,863
Total	$ 7,404,000

Table G.7
Alternative E—Soil and LNAPL Excavation on BT and in ROW, ISS on BT and ASKO, Excavation on EW

Bulk Terminal Property—ISS on Property, Excavation in ROW						
Task #	**Task List**	**Quantity**	**Unit**	**Unit Rate**	**Total**	**Notes**
	Site Prep and Environmental Controls					
	Mobilization	1	LS	$ 345,700	$ 345,700	ENTACT quote
	Survey	7.5	Week	$ 7,850	$ 58,875	ENTACT quote
	TESC and Pollution Prevention	7.5	Week	$ 1,075	$ 8,063	ENTACT quote - split 50/50 between BT and ASKO
	Stockpile Construction and Management	1	LS	$ 20,000	$ 20,000	Project experience, required for CAA-1 and 3 excavation
	Odor Control Foam Machine Rental	1.5	Month	$ 10,000	$ 15,000	ENTACT quote
	Odor Control Rusmar Foam	20	Drum	$ 540	$ 10,800	Quote from Rusmar
	ISS On Property					
	Well Decommissioning		Each	$ 500	$ -	Included in Excavation Below
	Electrical and Water Service	1	LS	$ 24,350	$ 24,350	ENTACT quote - split 50/50 between BT and ASKO
	ISS Batch Plant, Water Treatment Service Pad	1	LS	$ 42,350	$ 42,350	ENTACT quote - split 50/50 between BT and ASKO
	Water Treatment System Operation and Rental	1.5	Month	$ 39,000	$ 58,500	ENTACT quote
	Utility Capping	1	LS	$ 25,000	$ 25,000	Project experience
	Asphalt/Concrete Demolition and Removal	1,320	SY	$ 15.80	$ 20,856	RSMeans 024113175200
	Bench Excavation for Swell Containment (3 feet bgs)	1,320	CY	$ 19.80	$ 26,136	ENTACT quote
	Pre-Excavation/Debris Removal (10 feet bgs)	3,085	CY	$ 24.00	$ 74,040	ENTACT quote
	ISS Mixing - CAA-2.a	7,933	CY	$ 45.90	$ 364,125	ENTACT quote
	Swell Management	2,380	CY	$ 16.50	$ 39,270	ENTACT quote
	Disposal of Subtitle D Waste	2,244	Ton	$ 67	$ 150,348	ENTACT quote
	Final Grading	1,322	SY	$ 7.50	$ 9,915	ENTACT quote
	Building Demolition		--	$ -	$ -	Not included in FS cost
	Paving		--	$ -	$ -	Not included in FS cost
	ISS Testing					
	UCS Testing	79	Each	$ 125	$ 9,875	Geosyntec estimate - Lab prices
	Permeability Testing	79	Each	$ 275	$ 21,725	Geosyntec estimate - Lab prices
	Equipment for Lab	1	LS	$ -	$ -	Cost included in ASKO estimate
	Sample Shipping	158	Each	$ 8	$ 1,264	Geosyntec estimate
	Excavation					
	Well Decommissioning	16	Each	$ 500	$ 8,000	Project experience
	Concrete/Asphalt Demolition and Disposal	405	SY	$ 15.80	$ 6,397	RSMeans 024113175200
	Shoring	3,000	SF	$ 27.50	$ 82,500	RSMeans 3141161600
	Dewatering	1	LS	$ 25,000	$ 25,000	Project experience
	Utility Protection	1	LS	$ 10,000	$ 10,000	Project experience
	Excavate, Segregate & Stockpile Soil	4,590	Ton	$ 9	$ 41,310	Contractor quote, 1.7 tons/CY conversion factor
	Contingency Excavate, Segregate & Stockpile Soil	918	Ton	$ 9	$ 8,262	20% of baseline quantity
	Load, Transport & Dispose Subtitle D	4,590	Ton	$ 67	$ 307,530	Contractor quote
	Contingency Load, Transport & Dispose Subtitle D	918	Ton	$ 67	$ 61,506	20% of baseline quantity
	LNAPL Vacuuming	5	Day	$ 1,160	$ 5,800	Project experience
	LNAPL Disposal	5,000	Gal	$ 0.38	$ 1,900	Project experience
	Backfill and Compact	4,590	Ton	$ 29	$ 133,110	Contractor quote
	Contingency Backfill and Compact	918	Ton	$ 29	$ 26,622	20% of baseline quantity
	Restore ROW with Aspahlt	405	SY	$ 65	$ 26,325	Project experience
	Building Demolition		--	$ -	$ -	Not included in FS cost, applicable to all alternatives
	Paving		--	$ -	$ -	Not included in FS cost, applicable to all alternatives
	Engineering Services					
	Construction Oversight and Analytical Sampling	7.5	Week	$ 15,000	$ 112,500	Weekly cost based on one field engineer and PM @ 10 hr/wk
	Expenses and Travel	1	LS	$ -	$ -	Cost included in ASKO estimate
	Weekly and Monthly Reporting	7.5	Week	$ 1,700	$ 12,750	Geosyntec estimate
	Final Report	1	LS	$ -	$ -	Cost included in ASKO estimate
				SUBTOTAL	**$ 2,195,703**	

ASKO Property—In Situ Solidification and Stabilization						
Task #	**Task List**	**Quantity**	**Unit**	**Unit Rate**	**Total**	**Notes**
	Site Prep and Environmental Controls					
	Mobilization	1	LS	$ 101,900	$ 101,900	ENTACT quote
	Temp Facilities	14	Week	$ 2,000	$ 28,000	Geosyntec estimate
	Survey	7.5	Week	$ 7,850	$ 58,875	ENTACT quote
	TESC and Pollution Prevention	7.5	Week	$ 1,075	$ 8,063	ENTACT quote - split 50/50 between BT and ASKO
	Odor Control Foam Machine Rental	2	Month	$ 10,000	$ 20,000	ENTACT quote
	Odor Control Rusmar Foam	20	Drum	$ 540	$ 10,800	Quote from Rusmar, added contingency costs
	ISS Construction					
	Well Decommissioning	14	Each	$ 500	$ 7,000	Project experience
	Electrical and Water Service	1	LS	$ 24,350	$ 24,350	ENTACT quote - split 50/50 between BT and ASKO
	ISS Batch Plant, Water Treatment Service Pad	1	LS	$ 42,350	$ 42,350	ENTACT quote - split 50/50 between BT and ASKO
	Water Treatment System Operation and Rental	2	Month	$ 39,000	$ 78,000	ENTACT quote
	Asphalt/Concrete Demolition and Removal	1,722	SY	$ 15.80	$ 27,208	RSMeans 024113175200
	Bench Excavation for Swell Containment (3 feet bgs)	1,722	CY	$ 16.50	$ 28,413	ENTACT quote
	Pre-Excavation/Debris Removal (10 feet bgs)	4,019	CY	$ 22.50	$ 90,428	ENTACT quote
	ISS Mixing - ASKO Site A	14,352	CY	$ 48.10	$ 690,331	ENTACT quote
	Swell Management	4,306	CY	$ 18.5	$ 79,661	ENTACT quote
	Load, Transport & Dispose Subtitle D	2,927	Ton	$ 67	$ 196,109	ENTACT quote
	Final Grading	1,722	SY	$ 7.50	$ 12,915	ENTACT quote
	Building Demolition			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Paving			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Vapor Intrusion Assessment and Vapor Barrier Installation			$ -	$ -	Not included in FS cost, applicable to all alternatives
	ISS Testing					
	UCS Testing	119	Each	$ 125	$ 14,875	Geosyntec estimate - Lab prices
	Permeability Testing	119	Each	$ 275	$ 32,725	Geosyntec estimate - Lab prices
	Equipment for Lab	1	LS	$ 2,000	$ 2,000	Geosyntec estimate - Project experience
	Sample Shipping	238	Each	$ 8	$ 1,904	Geosyntec estimate
	Interceptor Trench Construction					
	Additional Mob for Interceptor Trench	1	LS	$ 71,300	$ 71,300	ENTACT quote
	Pre-Excavation/Obstruction Removal	1	LS	$ 7,300	$ 7,300	ENTACT quote
	PRB Wall Construction Cost	225	VSF	$ 127.8	$ 28,755	ENTACT quote
	Interceptor Trench	134	CY	$ 401	$ 53,734	ENTACT quote
	ZVI Cost	50	Tons	$ 900	$ 45,000	FS Estimate-Note we independently costed this out previously
	Load, Transport & Dispose Subtitle D Waste	155	Tons	$ 67	$ 10,385	ENTACT quote
	Engineering Services					
	Construction Oversight	7.5	Week	$ 15,000	$ 112,500	Geosyntec estimate
	Expenses and Travel	1	LS	$ 11,000	$ 11,000	Geosyntec estimate
	Weekly and Monthly Reporting	7.5	Week	$ 1,700	$ 12,750	Geosyntec estimate
	Final Report	1	LS	$ 30,000	$ 30,000	Geosyntec estimate
				SUBTOTAL	**$ 1,938,630**	

Table G.7
Alternative E—Soil and LNAPL Excavation on BT and in ROW, ISS on BT and ASKO, Excavation on EW

East Waterfront Property—Excavation						
Task #	**Task List**	**Quantity**	**Unit**	**Unit Rate**	**Total**	**Notes**
	Site Prep and Environmental Controls					
	Mobilization	1	LS	$ 12,000	$ 12,000	Contractor quote
	Survey	6	Each	$ 1,000	$ 6,000	Two surveys per excavation area
	TESC and Pollution Prevention	1	Month	$ 10,000	$ 10,000	Project experience, increased TESC cost for shoreline work
	Stockpile Construction and Management	1	LS	$ 10,000	$ 10,000	Project experience
	Construction					
	Well Decommissioning	5	Each	$ 500	$ 2,500	Project experience
	Dewatering Contingency	1	LS	$ 20,000	$ 20,000	Project experience
	Excavate, Segregate & Stockpile Soil	2,312	Ton	$ 9	$ 20,808	Contractor quote, 1.7 tons/CY conversion factor
	Contingency Excavate, Segregate & Stockpile Soil	462	Ton	$ 9	$ 4,162	20% of baseline quantity
	Load, Transport & Dispose Subtitle D	2,312	Ton	$ 67	$ 154,904	Contractor quote
	Contingency Load, Transport & Dispose Subtitle D	462	Ton	$ 67	$ 30,981	20% of baseline quantity
	Backfill and Compact	2,312	Ton	$ 29	$ 67,048	Contractor quote
	Contingency Backfill and Compact	462	Ton	$ 29	$ 13,410	20% of baseline quantity
	Building Demolition			$ -	$ -	Not included in FS cost, applicable to all alternatives
	Engineering Services					
	Construction Oversight and Analytical Sampling	2	Week	$ 11,000	$ 22,000	Weekly cost based on one field engineer and PM @ 10 hr/wk
				SUBTOTAL	**$ 373,812**	

Direct Costs	$	4,509,000
Seattle Sales Tax @ 10.1%	$	455,409
Total	$	4,964,409

Professional Services						
Task #	**Task List**	**Quantity**	**Unit**	**Unit Rate**	**Total**	**Notes**
	Engineering Design				$ 150,000	Project experience
	Ecology Review Costs				$ 30,000	Project experience
	Construction Reporting				$ 50,000	Project experience
	Institutional Controls Development and Implementation				$ 30,000	Project experience
	Permitting				$ 75,000	Project experience (ROW permit, shoreline permit, etc.)
	Well Installation	5	Each	$ 3,000	$ 15,000	Project experience
	Long-Term Monitoring (Semiannual for 2 years, Annual for 13 years)	17	Event	$ 17,100	$ 290,700	Project experience

Base Total	$	5,605,109
20% Contingency	$	1,121,022
Total	$	6,727,000